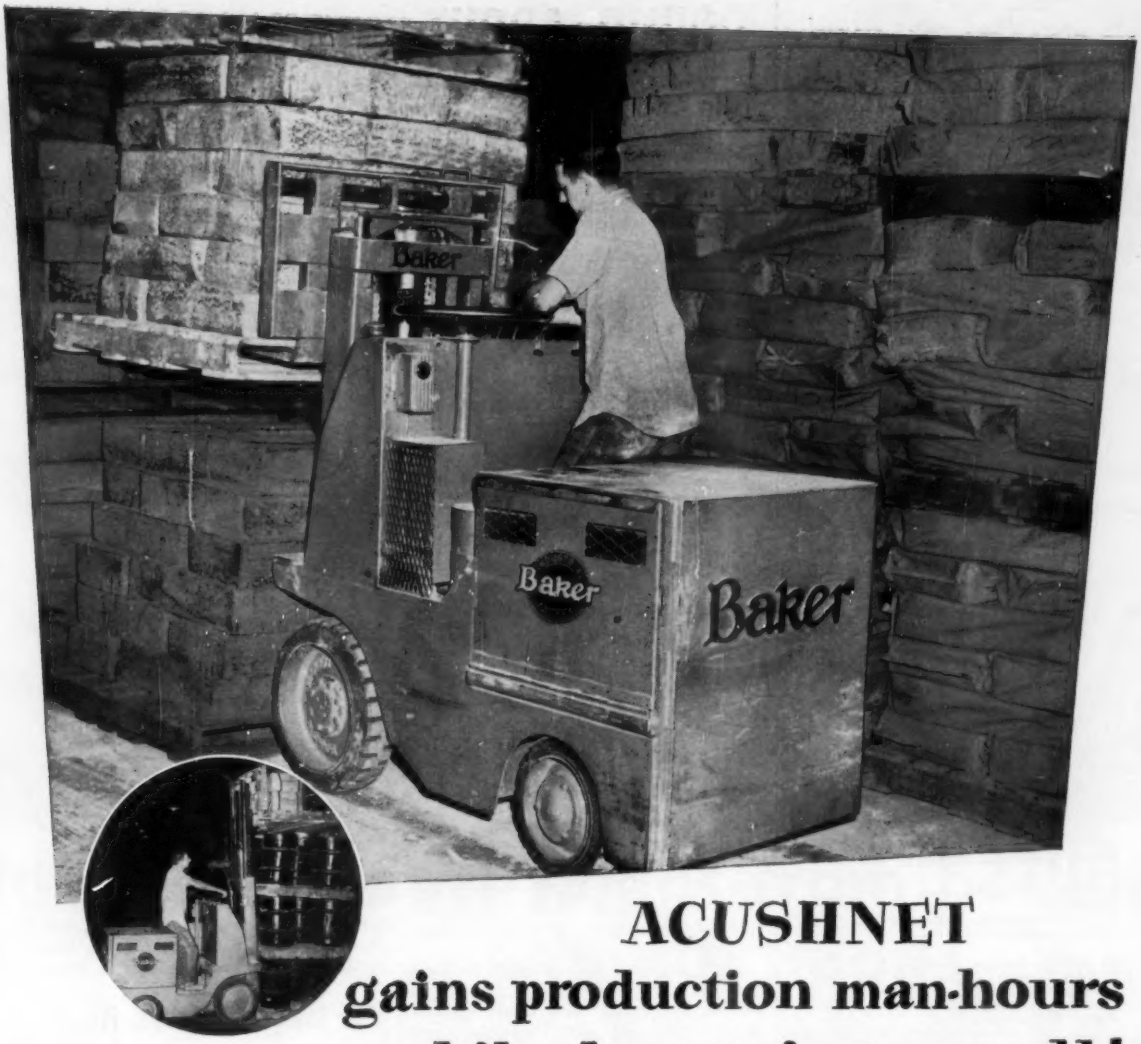

ACUSHNET gains production man-hours while decreasing payroll!

O Acushnet Process Company of New Bedford, Massachusetts, manufacturers of the well-known "Titleist" Golf Ball and supplier of precision-molded rubber parts to all of industry, has increased the productive efficiency of its labor force by mechanized handling with fork lift trucks thus eliminating backbreaking manual handling.

Last year the company purchased a Baker 4,000 pound fork truck for its receiving department. The truck's ability to enter a trailer and handle material on pallets was one of the factors in cutting freight handling costs in half. Time for unloading a typical 30,000 pound highway truck load of raw materials was reduced from 4 to 1¼ hours. The dependability of the Baker battery-powered truck, with practically no down-time and very little maintenance was another decided improvement over the gas fork truck formerly on this job. Additional advantages are quietness of operation and greater speed in handling and maneuvering.

Acushnet handles each month about a million pounds of raw materials such as baled crude rubber, synthetic rubber blocks, and drum-loads of raw ingredients. All are now handled on pallets with fork trucks.

Write for your free copy of the "Baker Handling Library", a portfolio of case histories showing actual cost savings in a wide variety of plants. The Baker Raulang Company, 1251 West 80th St., Cleveland 2, Ohio.

Baker.
industrial trucks

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'ROUND ABOUT with the editors in field and office

Edited by R. L. Marinello

Turner Construction Company Built Cherry Hill

WE THOUGHT we had covered all bases in the listing of consultants, architects, suppliers, etc., that had anything to do with the RCA Cherry Hill article appearing in our December issue, but it appears that we did not include the name of the Turner Construction Company, 420 Lexington Avenue, New York 17, New York.

In addition to the general contractor, the following architects and engineers and the work they handled were: Structural engineers: Severud-Elstad-Krueger, New York; Electrical and plumbing design: L. T. Klauder Associates, Philadelphia; Heating and air-conditioning design: R. J. Siegel, Philadelphia; Staff architect: Malcolm Wells, Collingswood, New Jersey; Consulting electrical engineer: Dr. I. M. Fawcett, Philadelphia; and Consulting structural engineers: Sauter & Castor, Philadelphia.

AIPE Luncheon

DETAILS OF THE luncheon being planned for the charter members and guests of the American Institute of Plant Engineers appears in the main editorial section of this issue.

It will be at the Saddle and Sirloin Club of the Stock Yard Inn, International Amphitheatre, Chicago, on Tuesday, January 25, at 12:30 p.m.

Plant engineers who plan to be here for the Plant Maintenance and Engineering Conference and would like to attend this informal luncheon get-together, should fill out the coupon reservation appearing with the announcement.

The coupon should be mailed to Ted Ramond, Plant Engineer, Goodman Manufacturing Co., 4834 South Halsted St., Chicago, Illinois, as soon as possible so that he will have an idea of the number of reservations to make.

Morris 1st Vice-Pres. SBME

Richard H. Morris, Editorial Director of Plant Engineering, was elected 1st Vice-President of the Society of Business Magazine Editors for 1955.

At the same meeting Frank P. Tighe, Editor of *Motor Age* was elected President; Eldridge Peterson, Editor of *Printers' Ink* was elected 2nd Vice-President; and Norman C. Firth, Editor of *Dun's Review and Modern Industry,* was elected secretary-treasurer. Members of the Executive Committee will be Richard C. Lurie, *American Exporter* and Colin Carmichael, *Machine Design.*

The SBME is a national professional organization of senior editors of 150 professional and technical magazines with a total circulation of over 2,500,000. Its purpose is to promote high editorial standards and help industrial magazines better serve their respective fields. The symbol of the Society, the Circle and Quill, appears near the top of the masthead column.

Atomic Reactor Memorial

ON DECEMBER 1, at the invitation of Bob Elson, WCFL, Chicago, our atomics expert, **Andy Kramer,** who is also a member of the Advisory Committee on Technological Information of the Atomic Energy Commission, gave a radio interview at 3 p.m. His comments concerned a brief review of the history of atomic power. He also advocated the preservation of this country's first atomic reactor built in 1942 at Stagg Field, University of Chicago, and later removed to Argonne Woods.

On television the following evening during John Harrington's news program at 10:30 p.m., Andy Kramer presented a brief history of the reactor and emphasized the importance of preserving it as a memorial to Dr. Enrico Fermi.

Philadelphia readers may have heard his discussion on Radioactive Aspirin over radio station WFLN (FM) on December 15. He appeared on "Meet the Engineer" program which follows the New York Times broadcast of News Items.

1955 Conference, Shows, Etc.

FOURTH ANNUAL Instrument Short Course will be held Thursday and Friday, January 27 and 28 at the Los Angeles Harbor Junior College, Wilmington, California.

Materials Handling Conference will be held at the Hotel Cleveland, Cleveland, Ohio, March 28 and 29.

The West's Second Plant Maintenance and Engineering Conference and Show will take place at the Pan Pacific Auditorium, Los Angeles, Calif., from July 12 to 14. The Conference will bring together from all parts of the country technologists in the field of plant engineering with emphasis on doing a better job at less cost.

Mississippi's BAWI Plan

AN OUTSTANDING factor which has meant much in the industrial development of Mississippi is the state's BAWI, or "Balance Agriculture With Industry" plan. This original program affords the

Plant Engineering is published monthly at Chicago, Ill. Subscriptions one year $10 in the U. S. A. Canada $11; Elsewhere $12. Acceptance under Section 34.64, P. L. & R., authorized by Post Office.

How to exhaust fumes from boiling brass . . . without hoods

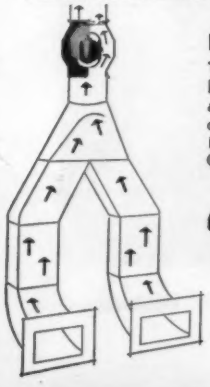
In brass melting furnaces, normal temperatures run from 1850° to 2350° F. Terrific heat and irritating fumes are given off by these open furnaces.

To improve working conditions around their furnaces, Standard Brass Manufacturing Company of Kansas City, Missouri tried several fan and hood systems without success. Then they installed five DeBothezat Bifurcator Fans, one for each two furnaces. Bifurcators with 27" diameter fan wheels and 2 HP motors, operating at 1140 RPM, were selected. The high velocity of these DeBothezat Bifurcator Fans made it possible to use open ducts behind the furnaces in place of hoods above them.

Now working conditions around the furnaces are satisfactory. And furnace charging and unloading is safer, easier and faster *without hoods.*

DeBothezat Bifurcator Fans are ideal for installation where space is limited, because they are compact, and install right in the duct work. Bifurcator Fans can be made of carbon steel, stainless steel, rubber coated steel, monel metal and many other corrosion or heat-resistant materials.

If you have a fume removal problem, DeBothezat Bifurcator Fans may be the answer. Write our factory for illustrated catalog DB-4-53.



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The Bifurcator is a motor driven axial-flow fan in a patented, divided housing. Motor is in an isolated chamber around which flue gases are by-passed (bifurcated) so that the motor always remains cool, clean and accessible. Bifurcators are available in many sizes from 1140 CFM (12" diameter fan with 1/20 HP motor) up to 45,000 CFM (48" diameter fan with 20 HP motor).

DeBothezat Fans

Division of American Machine and Metals, Inc.
EAST MOLINE, ILLINOIS

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DeBOTHEZAT FANS DIVISION
American Machine and Metals, Inc.
Dept. PE-155, East Moline, Illinois

Send me free Catalog DB-4-53 containing full data on Bifurcators.

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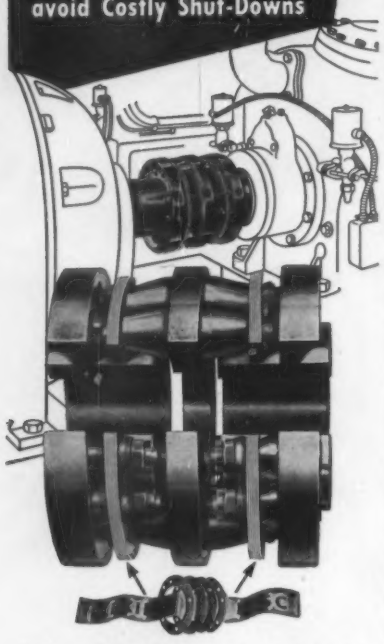
NAME AND TITLE

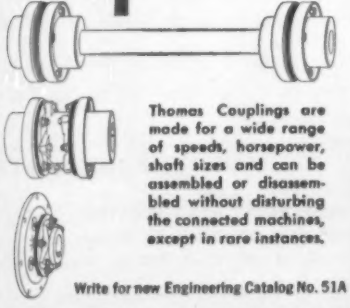
Specify THOMAS ALL METAL
FLEXIBLE COUPLINGS
for Power Transmission to avoid Costly Shut-Downs



Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Thomas Couplings are made for a wide range of speeds, horsepower, shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.

Write for new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA, U.S.A.

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'ROUND ABOUT

services of state, local and private leaders in locating new or branch plants, plus the assurance of community cooperation and support once they are established.

This plan was adopted to stimulate industrial growth in Mississippi. Basically, it permits communities to enter into and promote industrial development.

The Mississippi Agricultural and Industrial Board, headed by the Governor and composed of 33 business and industrial leaders of the state, administers the BAWI program. Assisting the Board is a staff of engineers and analysts to lend technical guidance.

If any plants are contemplating a move to Mississippi and would like to know more about this plan, they should write to William E. Barksdale, Executive Director, Mississippi Agricultural and Industrial Board, State Office Building, Jackson, Mississippi.

Midwest Welding Conference

LATEST DEVELOPMENTS in welding and various applications of welding processes will be discussed February 8 and 9 at the first annual Midwest Welding Conference at Armour Research Foundation of Illinois Institute of Technology, Chicago.

The men most qualified to talk about these two areas of welding will speak at this conference, sponsored by the Foundation and the Chicago section of the American Welding Society.

About 75 per cent of the program will be devoted to reports on actual industrial applications of welding processes. The remaining 25 per cent of the talks will cover latest welding research findings.

Additional information on this conference may be obtained from the Armour Research Foundation of the Illinois Institute of Technology, Chicago, Illinois, or the American Welding Society, 33 West 39th Street, New York 18, N. Y.

Definition of a Plant Engineer

IT IS RATHER difficult to give an all-inclusive definition for the many duties handled by a plant engineer. In the October, 1954 issue, Bob Hiller, plant engineer, Dravo Corp., gave us his interpretation.

Mr. A. J. Rogowski, Works engineer, Worthington Corp., Harrison, New Jersey, has sent us the following definition as his contribution:

"A plant engineer is one whose task it is to provide and maintain, economically and with minimum interference or interruption, the facilities required for the conduct of an enterprise."

Terminating Contracts

INDUSTRIES HAVING contracts with the government will be interested in reading this 60-page booklet "Contract Termination Guide." Properly used, this pamphlet is expected to result in a big savings in time and work for prime contractors, subcontractors and suppliers.

This guide takes the reader step by step through the termination process. It includes chapters on initiating termination action, steps preliminary to submission of claims, disposition of termination inventory and settlement procedures.

It may be obtained from the Manufacture Department, Chamber of Commerce of the United States, 1615 H Street, N.W., Washington 6, D. C. Orders for one to 10 copies are one dollar each and discounts are available for bulk orders.

Visit PE Booth at Plant Maintenance and Engineering Show

R. G. Hodge, plant engineer, second from left, and C. B. Mann, chief electrician, second from right, both of Ford Motor Co., chat with editors at Plant Engineering booth during last year's show. Visit the PE editors at Booth 601 this year

CAN'T DISTORT, CAN'T MISALIGN, ...because it has CANTILEVER DESIGN!

RIGHT-ANGLE

WORM-GEAR

SOLID CAST UNIBASE

PYRAMIDAL SUPPORT

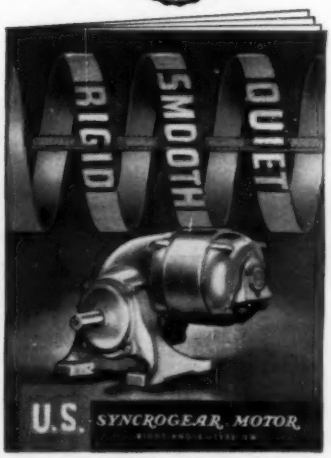
CLOSE-HITCH

SEALED PROTECTION

U.S. NEW TYPE GW SYNCROGEAR MOTOR

Mounting stresses absorbed. Gear and motor distortion-free.

Permanently accurate gear and bearing alignment are vital in any right-angle, worm-gear motor. In the amazing new Type GW Syncrogear motor the *cantilever* principle is employed. Why? —To prevent stress of motor and gear mounting. A solid-cast Unibase pyramidally supports the entire load. Type GW is extremely compact. Gear is sealed in dustproof case. Speeds, 20 to 155 r.p.m. Gear ratios up to 87:1. Horsepower, ¼ to 2.



HOW U. S. CANTILEVER DESIGN INSURES ALIGNMENT

U. S. MOTOR DESIGN
Motor and gearing mounted on single base. Cantilever position of motor is independent of external mounting stresses. Uneven floor mounting can't set up stress.
ORDINARY DESIGN
Gear and motor units mounted between two separate brackets permit distortion by bolting to irregular mounting surfaces.

New multi-colored descriptive booklet gives full engineering details

U. S. ELECTRICAL MOTORS Inc.
Los Angeles 54, Calif. • Milford, Conn.

MAIL COUPON for this new free SYNCROGEAR BOOKLET

REQUEST FOR TYPE GW SYNCROGEAR BOOKLET
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SHOWING FOR THE FIRST TIME - - -

A New Addition to the Dempster-Dumpster System of Low Cost Bulk Materials Handling

Now you can have either of two types of Dempster-Dumpsters in the fastest, most efficient and lowest cost method of bulk materials handling ever devised.

IN THIS MODERN, low cost system, one truck-mounted Dempster-Dumpster picks up, hauls and empties, or sets down intact, one loaded detachable Dempster-Dumpster Container after another, regardless of design or size, handling bulk materials of practically every description.

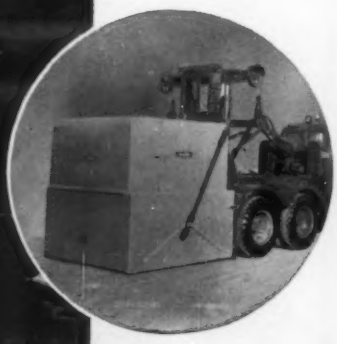
The new Dempster-Dumpster Type DTLF offers several desirable features along with all the economies provided by the Type LFW. These features include: (1) Improved load distribution with container carried in more forward position between wheel centers. (2) Extreme high dumping in cases where it is desired. (3) Vertical pick up of loaded container. (4) Container, loaded or empty, is always in horizontal plane in carrying position. Automatic locking device for positive rigidness of container while in carrying position is, of course, provided.

TREMENDOUS SAVINGS WITH THE DEMPSTER-DUMPSTER SYSTEM HAVE BEEN PROVED BEYOND QUESTION.

One truck-mounted Dempster-Dumpster, operated by only one man, the driver, serves scores of containers of various capacities up to three times greater than the average dump truck. You eliminate trucks standing idle . . . eliminate re-handling of materials . . . eliminate loading crews. You increase efficiency, sanitation and good plant-keeping.

Containers range from 2 to 21 cu. yds. capacity for use with recommended type Dempster-Dumpsters. Each container is designed to suit the materials to be handled—be they trash, rubbish, liquids, dust, bulky, light or heavy. Many leading plants, in almost every type of industry, have found it indispensable after installation. Its proved savings alone justifies an investigation of its potential value in your plant now. Write to us today for complete information. Manufactured and sold exclusively by Dempster Brothers, Inc.

The photo at left illustrates the amazing ability of the Type DTLF Dempster-Dumpster for high dumping. The three photos below show the Pick Up, Haul and Dumping action, hydraulically controlled from cab.



DEMPSTER

Photo above shows the new Dempster-Dumpster Type DTLF dumping 8 cu. yds. of rubbish. At right you see the Type LFW with load in carrying position. Dempster-Dumpsters are available in capacities capable of handling up to 38,000 pound payloads.

One Truck-Mounted
Dempster-Dumpster Handles Scores
of Containers... All Designs... All Sizes

B R O T H E R S **115 Shea Bldg., Knoxville 17, Tenn.**

this simple idea cuts V-Belt costs

— as a V-Belt bends, feel its sides change shape!

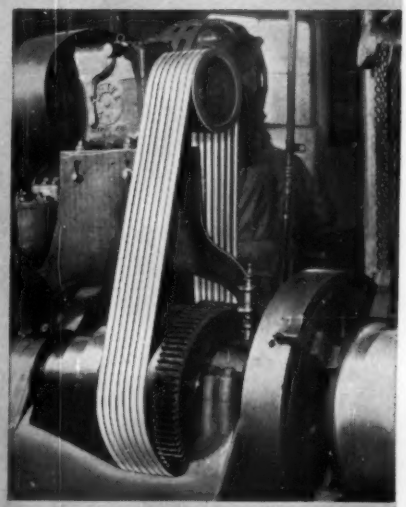
Pick up *any* V-Belt that has straight sides (Fig. 1) and bend it as if it were going around a pulley. At the same time, *grip its sides* with your fingers! You will feel the sides *bulge out* as in Fig. 1-A. Clearly, the bulging belt is forced to press *unevenly* against the V-pulley—and this concentrates wear at the points shown by arrows (Fig. 1-A).

Now bend the belt with CONCAVE SIDES

(U.S. PAT. 1813698)

. . . the GATES VULCO ROPE (Fig. 2)

Instead of *bulging*, the precisely engineered CONCAVE SIDES merely *fill out* and become perfectly straight. This belt, when bent, *precisely fits* its sheave groove (Fig. 2-A). The sides press *evenly* against the V-pulley. Therefore, wear is distributed *uniformly* across the full width of the Gates Vulco Rope—and this means longer belt life and *lower belt costs* for you!



Typical Gates Vulco Rope Drive—the Gates V-belts are built with Concave Sides to insure longer belt wear.

When you buy V-belts, be sure to get the V-belt with the CONCAVE SIDES — the Gates Vulco Rope!

VULCO ROPE DRIVES

Gates

Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

THE GATES RUBBER COMPANY
DENVER, U.S.A.
CO-8411

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The Thicker the Coat the better the protection!

PITT CHEM®
Tar Base Coatings
are up to
10 times as thick

as ordinary paints

ORDINARY paints and coatings may look like they're doing a good job in your plant. But if they're under 5 mils thick, tests show that they'll probably fail within months in a corrosive atmosphere. It takes a thick, tough, durable protective coating to positively control industrial fumes, spillage and atmospheric corrosion. And that's exactly what you get when you specify Pitt Chem Tar Base Coatings.

Pitt Chem Coatings are formulated from coal tar pitch for only one purpose —to stop corrosion. They're tough. They're durable. And their applied coat is up to 10 times as thick as ordinary paint.

Let us show you how little it will cost you to do a really effective job of protecting your tanks, buildings and industrial equipment against costly corrosion. Call for a Pitt Chem survey today.

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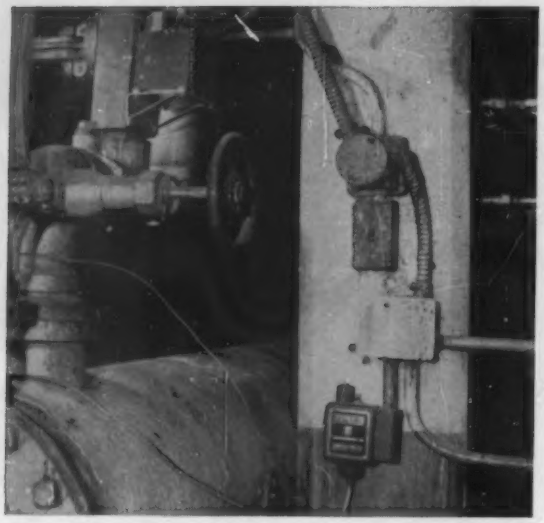
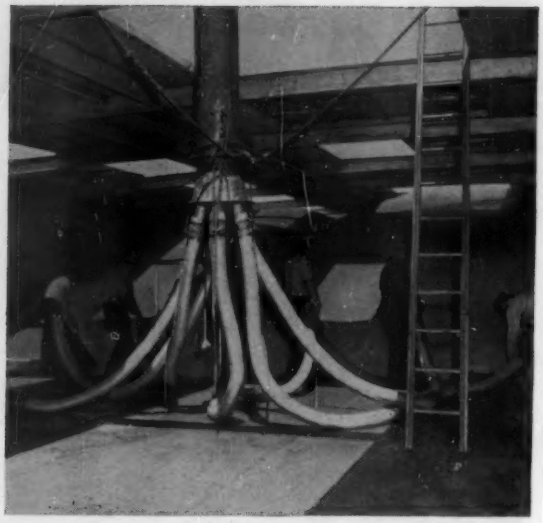


To prevent syrup from carmelizing, *the American Molasses Company's Brooklyn plant installed a Honeywell Temperature Controller working with a* **Modutrol** *motorized valve in the low pressure steam line. Now syrup is kept properly heated and production stoppages are cut.*

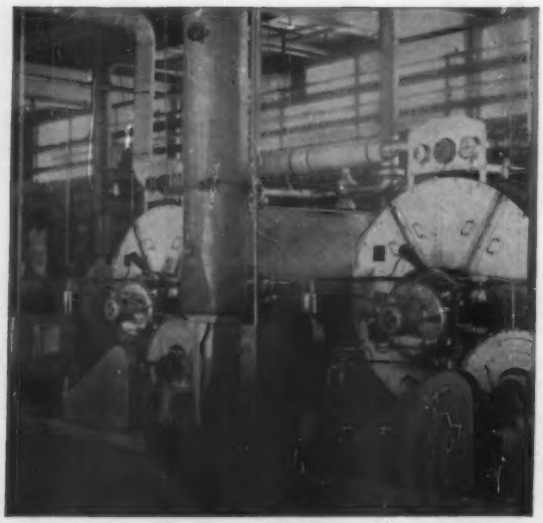
Control equipment cost—$150.00*



Time-consuming snags in grain ship unloading *are avoided by the Oregon Commission of Public Docks. Honeywell Controls, adjusted to regulate the line load, minimize dangers of vacuum lines becoming clogged . . . check sudden surges in suction which overload the motor.*

Control equipment cost—$174.25*

. . . . . Honeywell



Boiler burner failures are quickly noted *thanks to a Honeywell Temperature Controller which senses and warns of any temperature changes in the hot water line. Here at the Norton Pike Co., the boiler can be re-lighted before costly drops in water temperature occur.*

Control equipment cost—$11.10*

Guarantee of sufficient heat *for processing of corn syrup is facilitated by a Honeywell surface type thermostat at the A. E. Staley Manufacturing Co., Decatur, Ill. This control prevents cold syrup from overburdening the pump motor and slowing output.*

Control equipment cost—$11.10*

Curing of concrete pipe is simplified *through the use of Honeywell temperature control systems (left) for five steam curing kilns at the Graystone Concrete Co., Seattle.*

Each controller regulates its own kiln, by actuating a **Modutrol** *motorized valve on the steam line . . . raising, regulating and reducing temperature as desired.*

Control equipment cost—$750.00*

Industrial Controls

Increase production

PRODUCTION can frequently be accelerated through the low cost application of a simple control to regulate automatically some phase of the production process.

For example, Honeywell Temperature Controllers, installed to regulate steam curing kiln temperatures, have stepped-up concrete pipe manufacture by doing automatically a job that at one time had to be done manually.

Similarly, throughout the many intricate phases of production activity, versatile Honeywell Controls are called on time and again to eliminate snags and increase output.

Honeywell Controls are inexpensive . . . and uncomplicated in installation and construction . . . designed to do a job effectively and at minimum cost.

Throughout your plant there are many opportunities for Honeywell Controls to step-up output . . . as well as reduce costs, lower maintenance, improve quality.

Your nearby Honeywell sales engineer will be glad to discuss how *you can increase production* through the use of these controls. Call him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.

Also manufacturers of a complete line of precision measuring, recording and controlling instruments.

*List Price—Subject to change without notice.

MINNEAPOLIS
Honeywell

First in Controls

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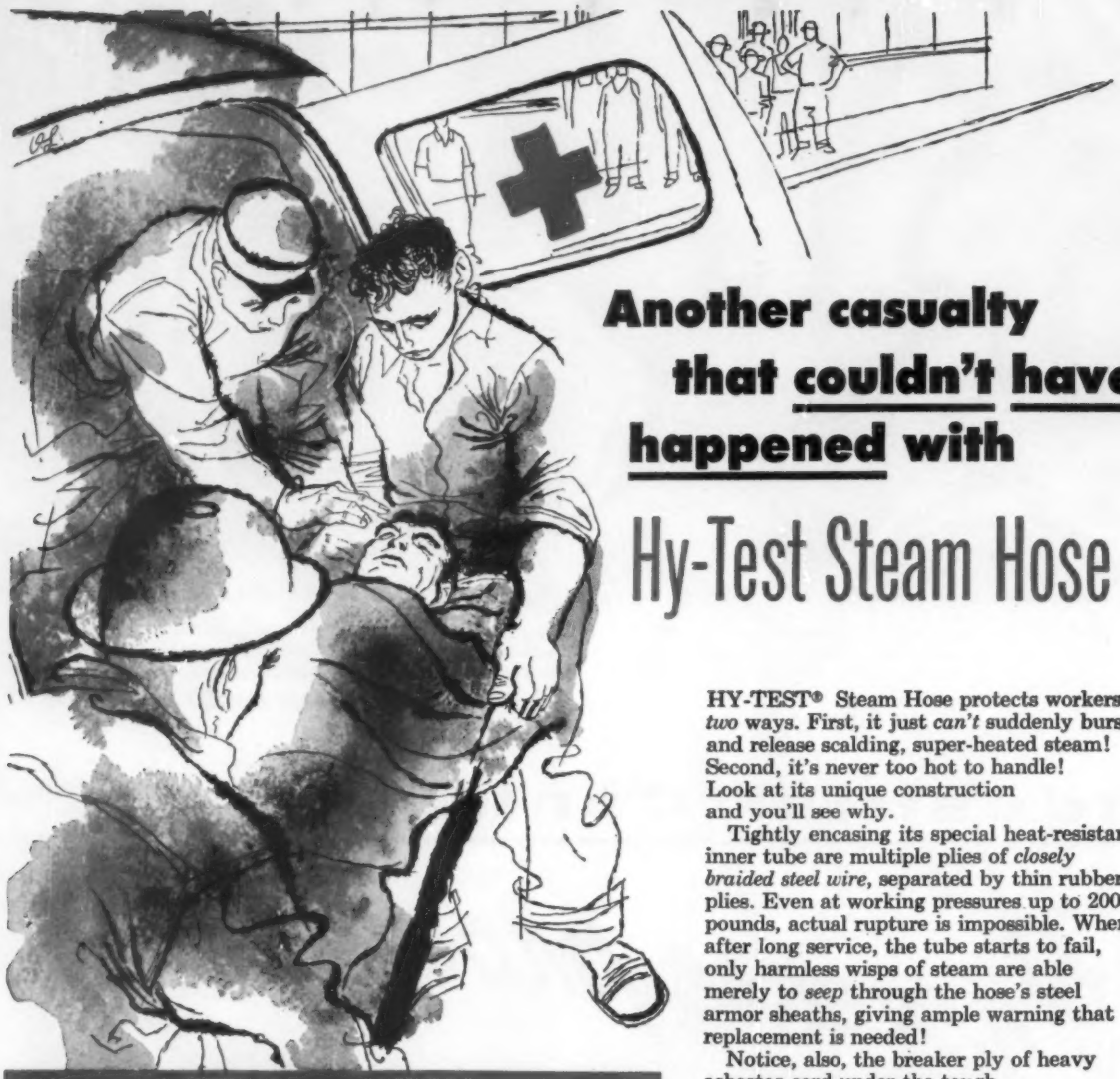


Another casualty that couldn't have happened with

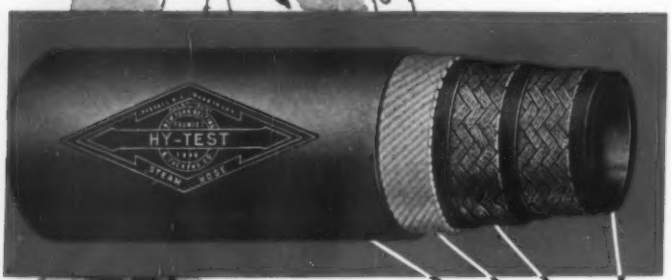
Hy-Test Steam Hose

HY-TEST® Steam Hose protects workers *two* ways. First, it just *can't* suddenly burst and release scalding, super-heated steam! Second, it's never too hot to handle! Look at its unique construction and you'll see why.

Tightly encasing its special heat-resistant inner tube are multiple plies of *closely braided steel wire*, separated by thin rubber plies. Even at working pressures up to 200 pounds, actual rupture is impossible. When, after long service, the tube starts to fail, only harmless wisps of steam are able merely to *seep* through the hose's steel armor sheaths, giving ample warning that replacement is needed!

Notice, also, the breaker ply of heavy asbestos cord under the tough, abrasion-resistant cover. This layer of insulation provides a cooler outside surface that makes HY-TEST Steam Hose easier to handle.

For your workers' safety and morale—and long-range economy, too—specify HY-TEST for high pressures! Your nearby NYB&P Distributor has it. If he's not listed in your local classified directory, write to address below.



Special tube assures extra long life.
Braided steel wire plies provide tremendous strength and safety.
Asbestos breaker ply serves as insulator.
Tough cover withstands external abrasion.

NYB&P

NEW YORK BELTING & PACKING CO. 1 Market St., Passaic, N. J.

America's Oldest Manufacturer of Industrial Rubber Products

For more facts circle 510 on Reply Card

"People often are hoggish about paper towels."

WITHOUT realizing it they'll use from two to four single fold towels just for drying.

— wasting as much as 40 inches of paper toweling.

But you can control this waste.

With savings up to 40%!

How?

By installing WESTROLL TOWELS in West Micromatic Cabinets.*

PEOPLE quickly unroll as little or as much as they want. But without realizing it they take less. Averaging 17 inches of soft, absorbent WESTROLL.

Saves janitors' time, too.

— one filling of the tamper-proof cabinet equals four of a single fold towel dispenser.

— there's less litter to clean up.

And washrooms are cleaner, neater.

LET a West representative tell you more about WESTROLL economies. Or send for our WESTROLL folder.

**Cabinets are loaned.*

OLDEST AND LARGEST
COMPANY OF ITS KIND
IN THE WORLD

WEST DISINFECTING Company

WEST DISINFECTING COMPANY — Dept. 52
42-16 West Street, Long Island City 1, N. Y. *(Branches in principal cities)*
In Canada: 5621-23 Casgrain Ave., Montreal

☐ I'd like a FREE copy of your folder on cutting towel costs with WESTROLL.
☐ I'd like to have a WEST representative telephone me for an appointment.

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January, 1955

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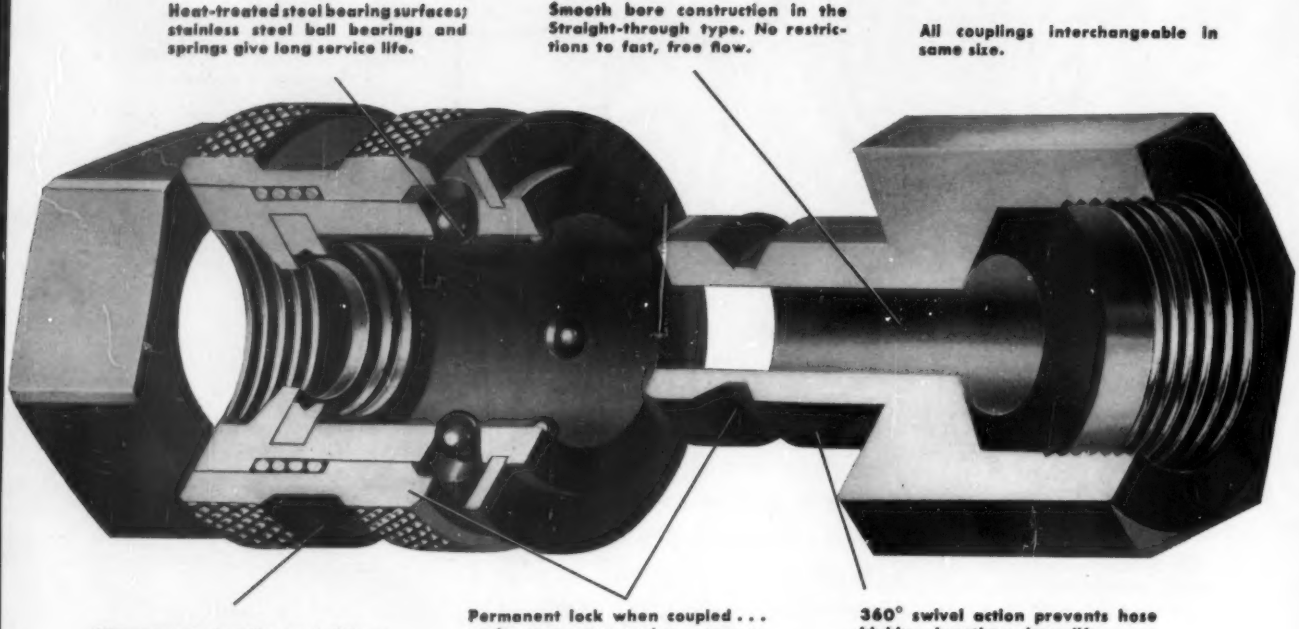
Titeflex

Introducing Quick-Seal...

the most versatile hose coupling ever made


Heat-treated steel bearing surfaces; stainless steel ball bearings and springs give long service life.
Smooth bore construction in the Straight-through type. No restrictions to fast, free flow.
All couplings interchangeable in same size.
Slim, easy-to-handle, no bulkiness or projections to snag or bend.
Permanent lock when coupled . . . can't snap-open under pressure. Retaining ring holds bearings in groove locking coupling.
360° swivel action prevents hose kinking, lengthens hose life.

Couples or uncouples in *ONE SECOND*—without tools

Leakproof at all operating pressures

If you handle chemicals, oils, greases, gases or liquids—in fact *any* material that will flow through a line—here's a new answer to your pipeline connection problems. For Titeflex Quick-Seal Hose Couplings make the operation faster, easier, more efficient . . . and they'll save you money.

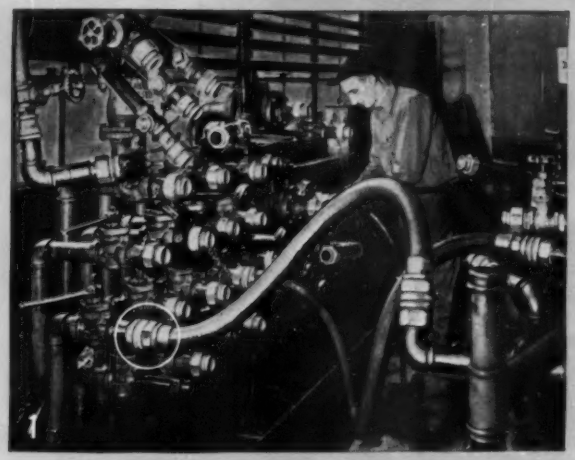
Quick-Seal Couplings are not just a variation of an old idea. They're a new approach to coupling design that gives speed and ease of handling without the bugaboos of leakage and flow restriction that have long plagued industry.

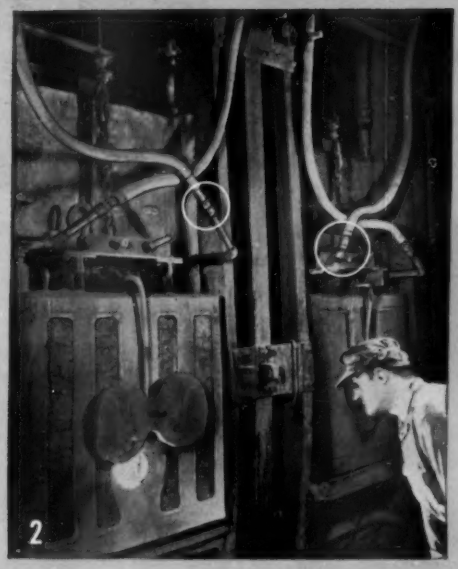
Titeflex Quick-Seal Couplings are made in three types—Straight-through, Single Check-valve and Double Check-valve, in a variety of alloys and sizes from ¼" up to 12" to meet any operating requirement.

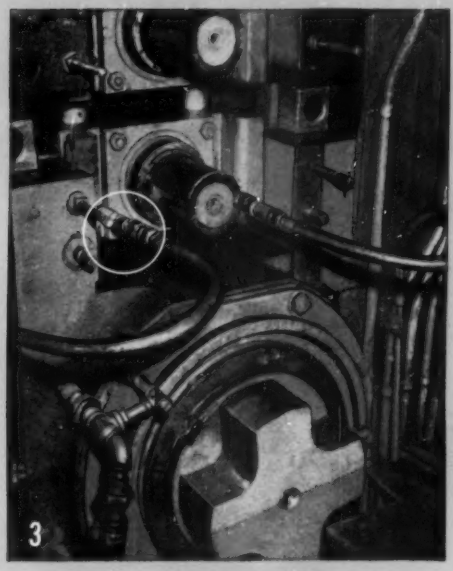
Why not investigate for yourself, the value of Quick-Seal Couplings in *your* plant. Mail in coupon today for full information on the new Quick-Seal Coupling.

Write for your free copy of the new Titeflex Quick-Seal Catalog

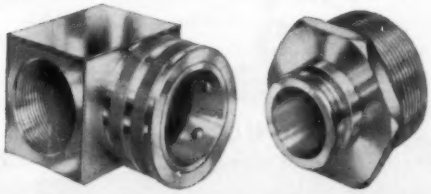
The HIGHER the Pressure the TIGHTER the Seal







Titeflex Quick-Seal Double Check-valve Couplings offer unlimited applications. No loss of pressure or fluid when line is uncoupled. Seal is effective immediately upon uncoupling.



Titeflex Block-Ell Couplings, Plugs and Caps in combination permit even greater flexibility for special requirements.

1 ***Blender of oils and greases*—With this piping "switchboard", one man can do the job *in seconds* that used to take 10 minutes.**

2 ***Open hearth furnace*—Cooling lines can be changed right at the firedoor with only one hand—reduces safety hazard.**

3 ***Steel Mill*—Quick-Seal Couplings in high pressure lines speed roll changing operation.**

4 ***Filling without spilling*—Refueling diesel engines. Uncoupling without leakage drastically reduces fueling time.**

Titeflex

Titeflex, Inc.
Industrial Products Division
526 Hendee Street
Springfield, Mass.

Quick-Seal Couplings

Please send complete catalog of your new Quick-Seal Couplings—without obligation.

Name _____

Title _____

Firm _____

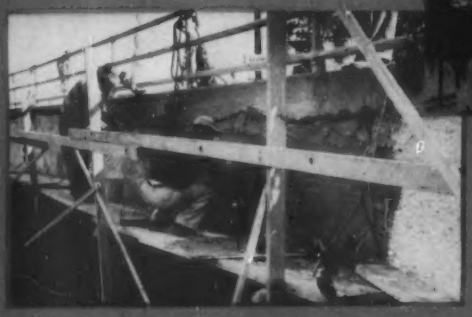
Address _____

City _____ **Zone** _____ **State** _____

Parlon Stays On!

"New Bridges for old . . ."

BETTER THAN NEW—In many ways this refurbished Rockland County, New York Bridge is better than new—thanks to a two-step renovation operation utilizing Parlon. Two coats of Parcote, a Parlon-based masonry paint manufactured by Shield Chemical Corp., Verona, N. J., provided the finishing touch—a moisture-resistant protective coating that will keep looking new longer.



"POSITIVE WATERPROOFING"—After eroded surface of bridge was removed, Drycrete plaster, another Parlon-based product manufactured by Shield, was applied. Just one coat of Drycrete mix provides "positive waterproofing protection," reduces shrinkage, resists cracking, improves the bond and results in a smooth surface ready for painting.

Renovating the Rockland County, New York Bridge presented a challenge . . . but one that was easily met by a "one-two" punch based on Hercules Parlon (chlorinated rubber).

The bridge's eroded surface was first replastered with a waterproofing mix using Parlon; then given two coats of a Parlon-based masonry coating that will keep it looking its Sunday best for a long time to come.

Meeting challenges is a Parlon specialty. Whether the surface to be coated is an exterior or interior . . . whether it's metal, concrete or wood . . . whether the finish must withstand severe exposure to the elements or even the corrosive effect of chemicals, you can count on Parlon-based paints for better service at lower long-term cost. See your dealer or write Hercules for details on Parlon-based coatings.

Cellulose Products Department HERCULES POWDER COMPANY *966 Market St., Wilmington 99, Del.*

LOOK FOR THIS LABEL ON THE PAINT CAN . . .

MADE WITH **Parlon®** HERCULES® CHLORINATED RUBBER

PARLON CHLORINATED RUBBER PAINTS ARE AVAILABLE FROM 400 MANUFACTURERS UNDER THEIR OWN BRAND NAMES

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B.F.Goodrich

TW ANALYSIS solves costly tire problem for Aluminum Smelting Company of Cleveland

Cutting and chipping, caused by oil and aluminum scrap, created a problem for Aluminum Smelting Company. The B. F. Goodrich Tire and Wheel Analysis man solved this problem.

Aluminum Smelting Company converts scrap aluminum to ingots. Here an industrial truck carries a load of ingots from the smelting furnace to the shipping department.

CUTTING and chipping of industrial tires, caused by aluminum scrap and oil, created an expensive problem for Aluminum Smelting Company of Cleveland. The tires on this company's fleet of 11 industrial trucks were being "chewed to pieces" after only a week or two of service.

The local B. F. Goodrich Tire and Wheel Analysis man was asked to make a study of the problem. As a result of his findings, BFG Pressed-On Deluxe Cushion tires were installed on all of the trucks. BFG's All-Purpose compounding was specified to provide resistance against oil damage and cutting and chipping.

Here's what Mr. Steve Robusky, Maintenance Superintendent of Aluminum Smelting, has to report—"These BFG tires have helped us eliminate cutting and chipping. Damage from oil has been eliminated almost completely. We have realized substantial savings in tire costs and maintenance expense."

FREE TW ANALYSIS CAN SOLVE YOUR PROBLEM

The B. F. Goodrich Tire and Wheel Analysis is a free service. Just contact your local B. F. Goodrich retailer or mail the coupon below. Without cost or obligation, a trained BFG man will study your materials handling operations. His recommendations can help you cut industrial tire costs . . . reduce maintenance expense. The advice you receive will be unbiased, for B. F. Goodrich makes a *complete* line of industrial tires for every type of service. A special TW Analysis is available for manufacturers of industrial equipment.

RESEARCH KEEPS B.F.Goodrich FIRST IN RUBBER

Specify B. F. Goodrich tires when ordering new equipment

The B. F. Goodrich Company
Tire & Equipment Division
Department TW-456, Akron 18, Ohio

Please send me:

- ☐ Additional information on your Tire and Wheel Analysis Plan
- ☐ Free copy of "Industrial Tire Guidebook"
- ☐ Free copy of "How to Get Extra Service out of Solid Industrial Tires"

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Company _____

Street _____

City _____ Zone_____ State_____

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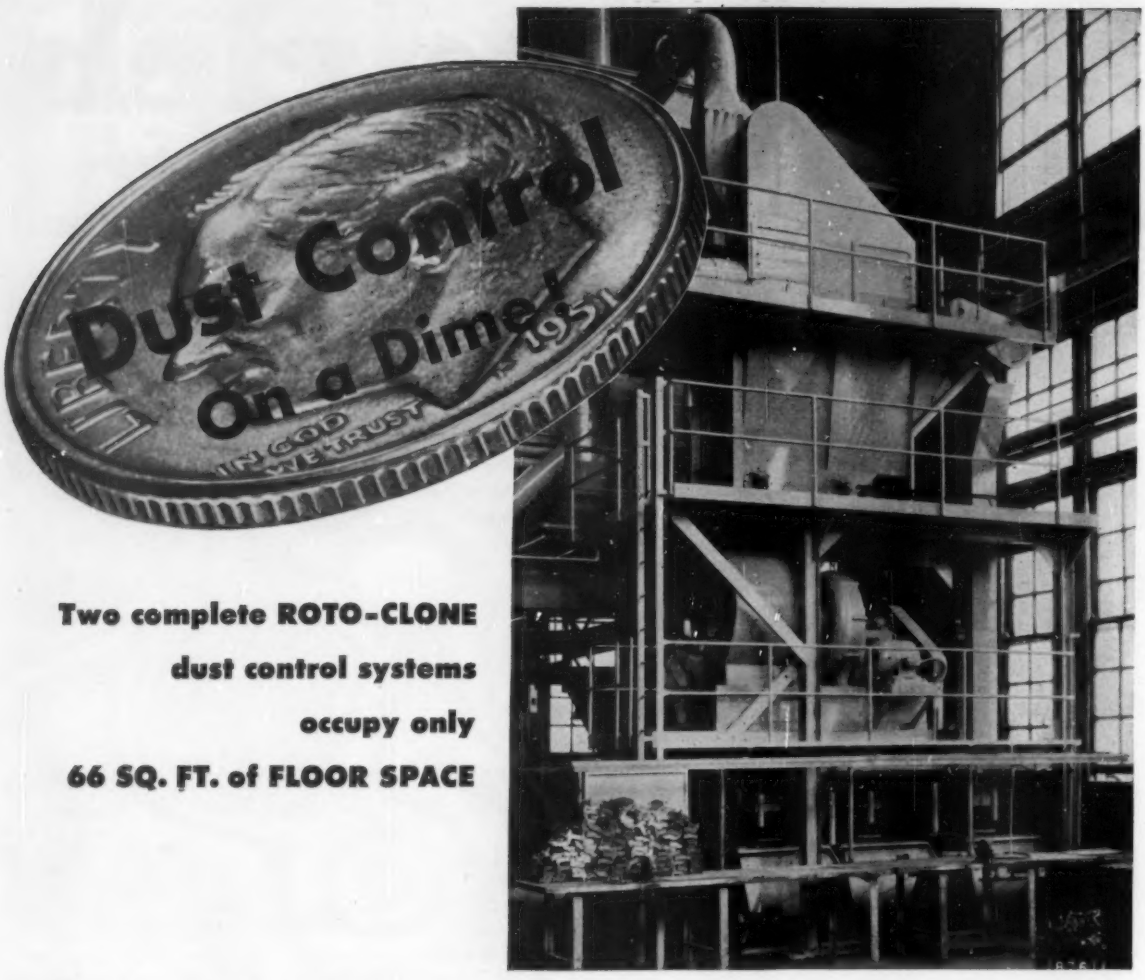

Two complete ROTO-CLONE dust control systems occupy only 66 SQ. FT. of FLOOR SPACE

LACK of room is no alibi for not providing efficient dust control. Here's a dual ROTO-CLONE* installation in a large foundry which occupies only 66 sq. ft. of floor space. A Type D of 4500 cfm capacity, located on lower platform, collects snag grinder dust. At top, a Type N of 6000 cfm capacity exhausts abrasive cleaning equipment. Dust and sludge from the two units are discharged through chutes into covered tote boxes at bottom for later disposal.

Every dust collector in AAF's complete line is a space saver. And, with all this compactness, every unit is a high efficiency collector designed for constant exhaust volume and maintained performance over a wide range of operating conditions.

Remember—there is always room for modern dust control. The right equipment coupled with creative engineering thinking is certain to come up with a practical, economical solution. AAF has both. We'd like to prove it in your plant.

*ROTO-CLONE is the trade-mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydro-static precipitator types.

AAF
herman nelson

American Air Filter
COMPANY, INC.

American Air Filter of Canada, Ltd., Montreal, P. Q. • 228 Central Avenue, Louisville 8, Kentucky

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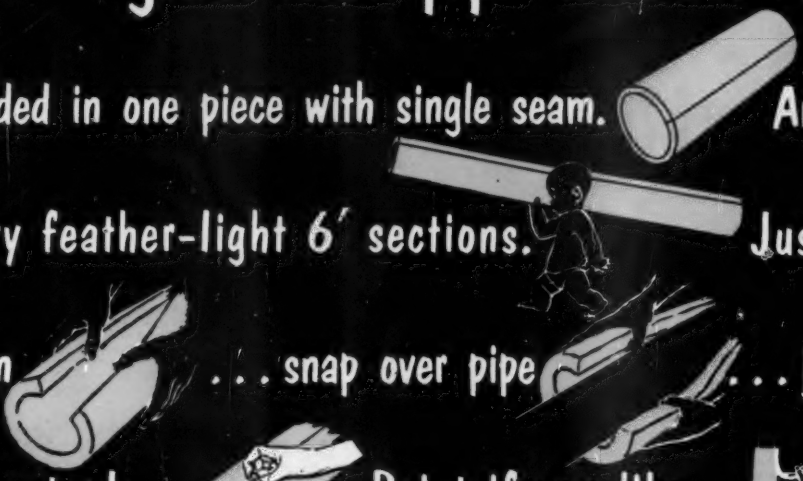
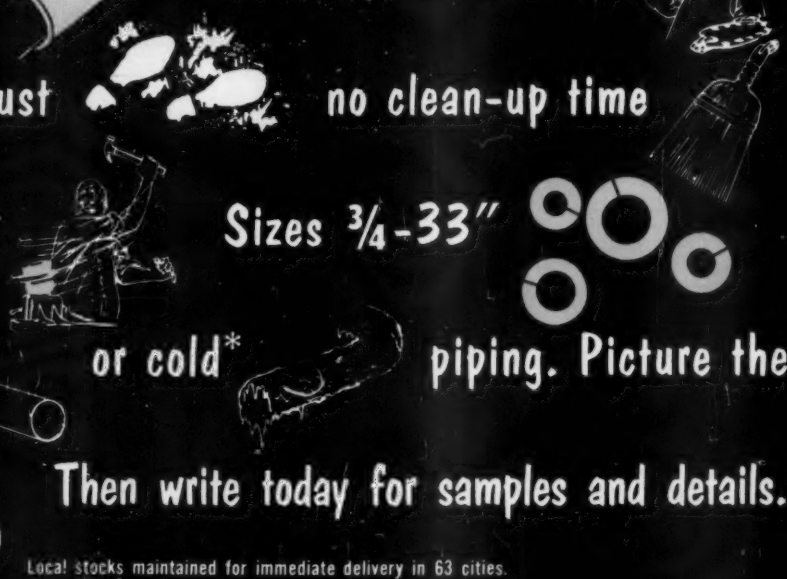
Nothing like new G-B SNAP-ON glass fiber pipe insulation!

Molded in one piece with single seam. Anyone can carry feather-light 6′ sections. Just spread seam . . . snap over pipe . . . join seam with staple. Paint if you like.



No mud or dust no clean-up time no breakage. Sizes ¾-33″ for hot or cold* piping. Picture the savings. Then write today for samples and details.



Local stocks maintained for immediate delivery in 63 cities.
See Yellow Pages for your nearest distributor.

*Comes with factory-applied vapor barrier facing adhered.

GUSTIN-BACON *Manufacturing Company* gb

Thermal and acoustical glass fiber insulations • Pipe Couplings and fittings • Railroad gaskets and supplies

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trickle?

or torrent?

the Ingersoll-Rand MOTORPUMP

gives you the capacity you need... the value you want!

When you want to move a few gallons of fluid . . . or up to 2800 gpm with heads to 650 feet, it will pay you to investigate the Ingersoll-Rand MOTORPUMP.

The MOTORPUMP is compact and efficient. Size-for-size it stands out by consistently moving more gallons per kilowatt of power used.

In value, too, the MOTORPUMP is a best buy. From impeller locknut to motor bearings, every MOTORPUMP is designed from experience to do the toughest job—for the longest time—at the lowest maintenance cost.

Now, when operating costs must come down, investigate the Ingersoll-Rand MOTORPUMP and its applications in your plant. Call your nearest I-R distributor for complete information, or write direct to:

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CAMERON PUMP DIVISION

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MOTOR PUMP

•End-to-end, top-to-bottom, the MOTORPUMP is crammed with design features and construction advantages that make it a better buy.

9-107

BULLETINS just released and of immediate plant interest

ELECTRICAL EQUIPMENT

101 **Induction and Torque Motors**—Catalog EI-3A, 26-pp, provides a comprehensive reference to company's induction and torque motors. In addition to listing physical characteristics, dimensional drawings and performance curves are also included, as well as detailed electrical specifications in appropriate groupings for induction units ranging from 1/1000 to 1/6 hp, for single, two, and three phase operation, 15 to 400 cycles. Listings for torque motors cover types and sizes for operation under stall conditions. Electric Indicator Co., Inc.

102 **Heavy Duty FHP Motors**—Features and performance characteristics of unidirectional motors in ratings up of 1/20 hp are presented in Bulletin F 3959-2. Specifications, dimensions and performance curves are provided. Barber-Colman Co.

103 **Flexible Power Distribution**—How bus duct meets industry's demand for more flexible power distribution, is explained and illustrated in 24-pp Bulletin 300. Connection of 10 ft lengths of duct which can be made from either side, as well as types of tap boxes, end closers and plug-in units employed, are shown. Elbow, tee and cross fittings are also described, as well as transformer taps, flanges and switch board stubs. Complete application and dimensional data plus specifications are included. Continental Electric Equipment Co.

105 **Rotary, Multipole Switches**—Twelve-pp Catalog 8054-IN on rotary multiple switches, contains complete wiring diagrams and contact charts for voltmeter, ammeter, and voltmeter-ammeter switches. Detailed drawings of snap-acting and detent-action switches are included, with handle and panel-mounting data, physical dimensions, special switch information, electrical ratings. Electro Switch Corp.

106 **High Voltage Starters**—Folder 1060 introduces a line of air-break electric starters for 2200- to 5000-v squirrel cage, wound rotor, synchronous motors. Illustrates starters using a 50,000-kva air-break contactor. Sectional and complete views of three styles are provided. The Electric Controller & Mfg. Co.

107 **Motor Control Centers**—Eight-pp Bulletin 401 explains how Concentrol standardized modular structures concentrate a larger number of motor controls in one complete packaged unit. Illustrations show details of design and construction. Also described and pictured are Concentrol structures in three NEMA types, as well as a fusible combination type. Layout and short circuit application data, as well as dimensions, ratings and specifications are included. Continental Electric Equipment Co.

108 **Storage Batteries**—The question of how much efficiency is gained in receiving, storing and distributing material in unit pallet loads is answered in an article describing industrial truck, material handling operations at a large commercial bakery. Other illustrated case histories describe pallet handling in the world's largest apple storage warehouse, and the installation of company's first MC storage battery in a high-tiering truck. Edison Storage Battery Div., Thomas A. Edison, Inc.

109 **Guide to Printed Circuitry**—Advantages of printed circuitry for electrical and electronic systems are covered in this 12-pp bulletin. Discusses potentials and economies of printed circuit design and construction as compared with handwriting methods. Covers basic facts related to applied printed circuitry and methods of producing printed circuits. Also gives specifications, properties of Copper-Clad Phenolite, a base material for printed circuits. National Vulcanized Fibre Co.

LIGHTING, COMMUNICATIONS

110 **On Planned Lighting**—While slanted toward office lighting, this 20-pp booklet contains valuable information on lighting and illumination practices of general industrial interest. Written in non-technical language, it covers such topics as layout and planning, maintenance, room finishes and color, quantity of light, fluorescent vs. incandescent, light distribution, natural lighting, and various lighting systems. The book contains numerous photos of modern lighting techniques and also some comparison pictures of poor installations. Charts of recommended values of illumination in terms of foot-candles are included, and sound reduction-illumination systems are discussed. Sylvania Electric Products Inc.

111 **Job-Rated Lighting**—Fluorescent lighting units—more than 80 models in all—for a wide range of industrial lighting applications are described and pictured in 12-pp Catalog 438. Gives general specifications and features of the line and provides ordering and other information for the various models which offer an excellent choice of lamp, lampholder, shielding and reflector types. Also shows how to hang the fixtures, gives simple methods for continuous row assembly. Mitchell Mfg. Co.

112 **Telephones at Work**—How a large brewery uses a private internal telephone system in controlling quality and integrating complex stages of operation is told in 8-pp Circular 1762. Applications of telephone facilities in controlling processing operations, speeding product distribution and increasing general plant efficiency are discussed. General specifications of telephone equipment are listed. Automatic Electric Sales Corp.

113 **Two-Way Radio**—This illustrated 12-pp bulletin shows what two-way radio is, how it works, and what it does. Applications in various industries are detailed and illustrated, and one section is directed to special industrial and low-power industrial services. Bulletin explains FCC controls of available channels and tells how the Frequency Allocation Committees work. Radio equipment for industrial use is described in detail and typical installations illustrated. Also explains means for procuring a two-way radio system, giving the various steps of planning, installing, operating and servicing. Engineering Products Div., Radio Corp. of America.

114 **Power Line Carrier Systems**—How modern power line carrier equipment can be used in conjunction with power lines to meet the increasing communications needs of expanding utilities is told in 12-pp Technical Bulletin E-111. It delves into the advantages and uses of three types of power line carrier equipment—manual simplex, automatic simplex, and duplex. Types of telephone termination services provided for each are tabulated. Equipment components, transmitter, receiver, control units, accessories, are described and illustrated, and specifications are included. Motorola Communications & Electronics, Inc.

115 **Communications for Pipelines**—Form F-634 cites advantages of pulse-time modulation microwave equipment for dependable and low cost communications for pipelines. Touches upon use for supervisory control applications, telephone service, telemetering, etc. Federal Telephone and Radio Co.

116 **Communications Dictionary**—Words and definitions peculiar to the field of microwave and mobile radio communications are compiled in this 40-pp glossary of radio terms. Utilizes sketches, diagrams, and charts, as well as text, to define esoteric terms which describe the theory, nature, and operation of radio communications equipment. Glossary ranges from "absorption coefficient" to "zero-bias," lists technical and non-technical organizations of interest to communications engineers, and supplies abbreviations of most widely used technical terms. Engineering Products Div., Radio Corp. of America.

HEATING, REFRIGERATION AND AIR CONDITIONING

118 **Underfloor Heating System**—Installation details and specifications for Ceramiduct, a clay product for perimeter and radial underfloor slab heating duct systems, are included in this illustrated bulletin. Emphasizes such advantages as economy, and resistivity to thermal shock, rust, corrosion, and disintegration. Straitsville Brick Co.

119 **Air Conditioning Units**—Completely revised, 32-pp Air Conditioning Catalog 7554 covers fan performance data, heating and cooling coil performance, data on filters and mixing boxes, and physical and dimensional data. Other features include typical selection examples, and specifications for company's air conditioning units. Young Radiator Co.

120 **Technical Refrigeration**—Twelve-pp Bulletin 754 covers environmental testing and processing equipment. Provides illustrations and specifications on recently redesigned altitude, humidity, low temperature and pre-fabricated test chambers as well as specialized testing equipment. Includes helpful engineering data. Bowser, Inc.

VALVES, TRAPS, PIPING AND ACCESSORIES

121 **Valves for Paper Industry**—This 8-pp bulletin is designed to clarify procedures for specifying stainless steel valves and fittings in the pulp and paper industry. In addition to discussions on applications, processes, methods of installation and maintenance, the booklet includes diagramatic illustrations and tables on mechanical properties, physical properties and corrosion resistance. Cooper Alloy Corp.

122 **Unions, Check Valves**—Illustrated Catalog 55, 24 pp, describes and provides ordering information on a line of forged steel unions and check valves. Socket-weld, high-speed, orifice, O-ring and other unions are included. Catalog pvvides service recommendation:, dimensions and list prices. Also included is table covering discharge of water to atmosphere. Clayton Mark & Co.

123 **Air Motors and Valves**—Bulletin SP-50, 28-pp, illustrates and describes dimensions and specifications of company's air motors and valves. Includes 75 illustrations and 27 specifications charts. Dimensional details facilitate application of the air motors and valves to most any operation. Charts also list accessory items. The Bellows Co.

124 **Heating System Traps**—Forged bronze steam traps for low and high pressure heating systems are described in this bulletin. Shows how trap works in air venting, condensate draining, steam trapping, other functions; also gives engineering and design features. Reduction of water hammer, improved heat transfer, presetting of temperature differential, and other advantages are discussed. Includes dimensions, installation tips. Velan Engineering Ltd.

On pages 169-170 are two postage-free Reader Service Cards provided for your convenience in ordering these bulletins. You may also use the cards to order any literature mentioned in ads.

125 **Steam and Air Traps**—Form 5415 provides illustrated information on steam and air traps for pressures to 600 psig, stressing larger capacity, simplicity of operation and economy. Includes capacity data, selection and installation suggestions. Also describes steam specialties for low pressure systems. The C. E. Squires Co.

126 **Protection of Pipes**—An aluminum jacketing for insulated lines, towers, vessels and tanks is described in this illustrated folder. Tells how it reduces maintenance, is weather- and corrosion-resistant, easily applied, offers other advantages. Also shows how to apply this covering. Walex Metal Products Co.

INSTRUMENTS, CONTROLS

127 **Electric Proportioning Control**—Sixteen-pp Folder (ND47(7) introduces this company's Series 60 electric proportioning control, available for proportional action control, for position-adjusting type or duration-adjusting type control. Each of these is dealt

BULLETINS

(Begins on page 21)

with in detail, text covering features and application suggestions. Illustrations include photos, dimensional drawings, circuitry diagrams. Leeds & Northrup Co.

128 **Remote Transmission Systems** — This 7-pp catalog introduces company's remote transmission systems for water, sewage and process plant uses, Autocon Telestep. Defines telemetering, types of telemetering equipment and describes advantages and benefits available with Telestep. Catalog reviews five models; 1-step, 2-step, 2-step with reporting signal, multiple step (bridge type), and proportional-multiple step. Basic Autocon pressure, float and probe sensors are discussed, also auxiliary protective devices. Automatic Control Co.

129 **Time-Pattern Transmitters** — Specification 287-1 lists complete specifications for the company's pneumatic time-pattern transmitter unit, an instrument which positions the set point indices of one or more instruments according to a definite time-pattern. Industrial Div., Minneapolis-Honeywell Regulator Co.

130 **Meters for Industrial Liquids**—Bulletin 567, 8-pp, presents full details on company's industrial liquid meters. Included are various quantity control meters, models providing printed tickets for each delivery or batch, and those with simple direct reading registers. Includes chart which helps in selection of proper size and type of meter for any given application. A list of 150 common chemicals and liquid ingredients used with the meters is also included. Neptune Meter Co.

131 **Receiver Recorder**—A receiver recorder for pneumatic and electric transmission systems, is explained in detail in 12-pp Product Specification E12-5. Provides liberal illustrations, application information, operation and engineering data and ordering specifications. Some typical measuring circuits are diagrammed. Bailey Meter Co.

132 **Automatic Temperature Control**—Bulletin HT-1, 16-pp, discusses automatic temperature control for induction heating equipment. Covers theory, components of induction heaters, selection of control units, requirements for control, temperature, and radio frequency. Contact control and proportioning control systems for induction heating and melting are described. Bulletin contains tables on induction heating frequency scale, methods of controlling radio frequency and high frequency induction heating equipment, as well as diagrams showing aspects of design, operation. Minneapolis-Honeywell Regulator Co.

133 **Magnetic Tape Recording** — Data recording, machine control and process regulation by magnetic tape recorders are covered in 16-pp illustrated Bulletin D2-1. Discusses advantages of magnetic tape recording, explains use with scanning, recording, regulating and other types of instrumentation. Describes tape recorder and reproducer and gives performance figures. Some typical magnetic tape applications are described briefly. Data is also included on standard and special models and accessories. Ampex Corp.

134 **Control Drive** — Product Specification P81-1, 6-pp, describes design and operation features of company's control drives, which provide remote-controlled pneumatic power for precise positioning of regulating devices through mechanical linkage. Contains schematic diagrams and a table which aids in selecting a drive meeting specific operating and installation requirements. Bailey Meter Co.

135 **Notes on Pyrometry**—This article discusses various aspects of instruments for the determination and control of industrial temperatures. Among the topics treated are: factors affecting the accuracy of thermocouples; contact pyrometers; effects of heat input and loss on tempreature equilibrium in a furnace; partial and total radiation pyrometers; and surface-temperature signals of a chemical nature. Tempil Corp.

137 **Sampling System**—A newly developed system for continuous sampling and oxygen measurement of combustion processes is described in Bulletin 703. Points out advantages of system and diagrams component parts. Selection of sampling tube, gas selector units, and other parts is discussed. A companion bulletin, No. 607, discusses oxygen measurement in combustion. Arnold O. Beckman, Inc.

DUST CONTROL

138 **Pharmaceutical Dust Control**—How to control dust in the manufacture of pharmaceutical products is the subject of Bulletin 550-D. Three illustrated case histories are cited, covering dust control at tablet presses, packagers, mixers, dryers, and materials conveying equipment. Diagram explains efficiency of company's dust collectors. American Wheelabrator & Equipment Co.

139 **Magnetic Impulse Rapping**—This 6-pp bulletin describes company's MI Rapper, a device for automatic and continuous cleaning of the collection electrodes in an electrostatic precipitator. Includes a schematic diagram of the rapper, an explanation of its basic operating principles, illustrations of its components, summary of features. Research-Cottrell, Inc.

140 **Synthetic Filter Cloths**—To help select the right filter cloth for any application in filtration or dust collection, this 6-pp folder represents engineering data and other pertinent information. Feon Dynel, Nylon, Orlon, Polyethylene, Saran, and other materials are covered. Includes charts of chemical and temperature resistance, discussion of technical considerations, magnified views of various weaves available. Filtration Engineers, Inc.

CONSTRUCTION AND MAINTENANCE

141 **Cold Weather Concreting** — Technical Bulletin 23, 20 pp, now available to plant engineers, provides information on the special requirements of cold weather concreting. In addition to a general discussion, bulletin deals with the objectives of winter concreting, conditions requiring protective measures, and general precautions. Graphs show compressive strengths at low and normal temperatures for lean and rich mixes, effect of calcium chloride on strength, etc. The Master Builders Co.

142 **Tips on Translucent Panels** — This folder discusses basic requirements, and outlines standards for specifying and purchasing translucent building panels. Gives recommendations for distinguishing good from inferior panels in respect to: weight-thickness, glass content, strength, light transmission, uniformity, surface finish, pitch and depth, pit and bubbles, and weather resistance. Corrulux Div., Libbey-Owens-Ford Glass Co.

143 **Fiber Glass Panels**—This 8-pp brochure describes company's Daycor, a translucent fiber glass building panel used for partitions, enclosures, and other building applications. Describes easy installations of the material, which can be sawed, nailed, screwed or drilled like wood. An insert reproduces the 10 colors in which the material is available and lists specifications. Strick Plastics Co.

Reader Service Cards for ordering bulletins are on pages 169-170. Be sure to include your name, job title, and company.

144 **Porcelain Building Panels**—Porcelpanels—architectural porcelain enameled steel or aluminum—are described in 12-pp Bulletin 1154. While designed to assist architects in specifying building walls or wall facings, this book should be of equal value to the plant engineer. Included are illustrations and architectural details for a number of buildings; specifications for porcelain enameled steel and aluminum; data on color, finishes and other properties; and a series of typical construction details. Construction details are rendered to scale, allowing direct use of the drawings in design work. Ingram-Richardson Mfg. Co.

145 **Framing Anchors**—A simple way to level floor and ceiling joists, automatically, is shown in this small folder. Detail drawings illustrate where and how different types of Trip-L-Grip anchors are applied to attain stronger, more economical nailed joints. Included are details for fastening floor joists to beams or headers, ceiling joists to beams or trusses, etc. Timber Engineering Co.

146 **Preserving Concrete Floors** — How to eliminate concrete dusting and seal concrete surfaces against the effects of food acids, grease, oil and abrasive wear by means of treatment with Stontop is explained in this folder. Tells where to use this treatment and how to apply it. Stonhard Co.

147 **Transparent Glazing** — Bulletin 1052 gives physical properties, uses, sizes of Homalite CR-39 a transparent, scratch- and abrasion-resistant glazing material formulated of thermosetting resins. Includes sample of the plastic. The Homalite Corp.

148 **Doors for Reducing Noise**—Sound reduction doors for a broad range of uses are described in this 8-pp bulletin of engineering information. Installation photos show types of doors in present use. Design factors in reducing noise are explained, and tips given on selecting doors for sound reduction. Doors for unusual needs are also considered. Large scale drawings illustrate construction details. Standard features in hardware and frame construction are explained. Sound Reduction Div., Jamison Cold Storage Door Co.

149 **Hollow Metal Doors**—Four types of doors for use in commercial buildings are described in this illustrated catalog. They include flush type swing doors, panel type swing doors, entrance doors, and Underwriters' flush and panel doors. The folder lists their uses and advantages, shows construction features, hardware and equipment, and gives installation instructions for solid masonry, brick veneer or frame construction, and in partitions. Gives stock types and sizes with door and glass dimensions. Detroit Steel Products Co.

TOOLS, WELDING AND MACHINE SHOP EQUIPMENT

150 **Portable Power Tools**—Catalog 5410, 28 pp, provides application and ordering information on a line of portable power tools. Covers electric hammers, hammer drills, saws, drills and screwdrivers, grinders and sanders, and concrete vibrating equipment, also gas-powered paving tools and others. Book is generously illustrated with pictures of the tools and photos of them in use. Syntron Co.

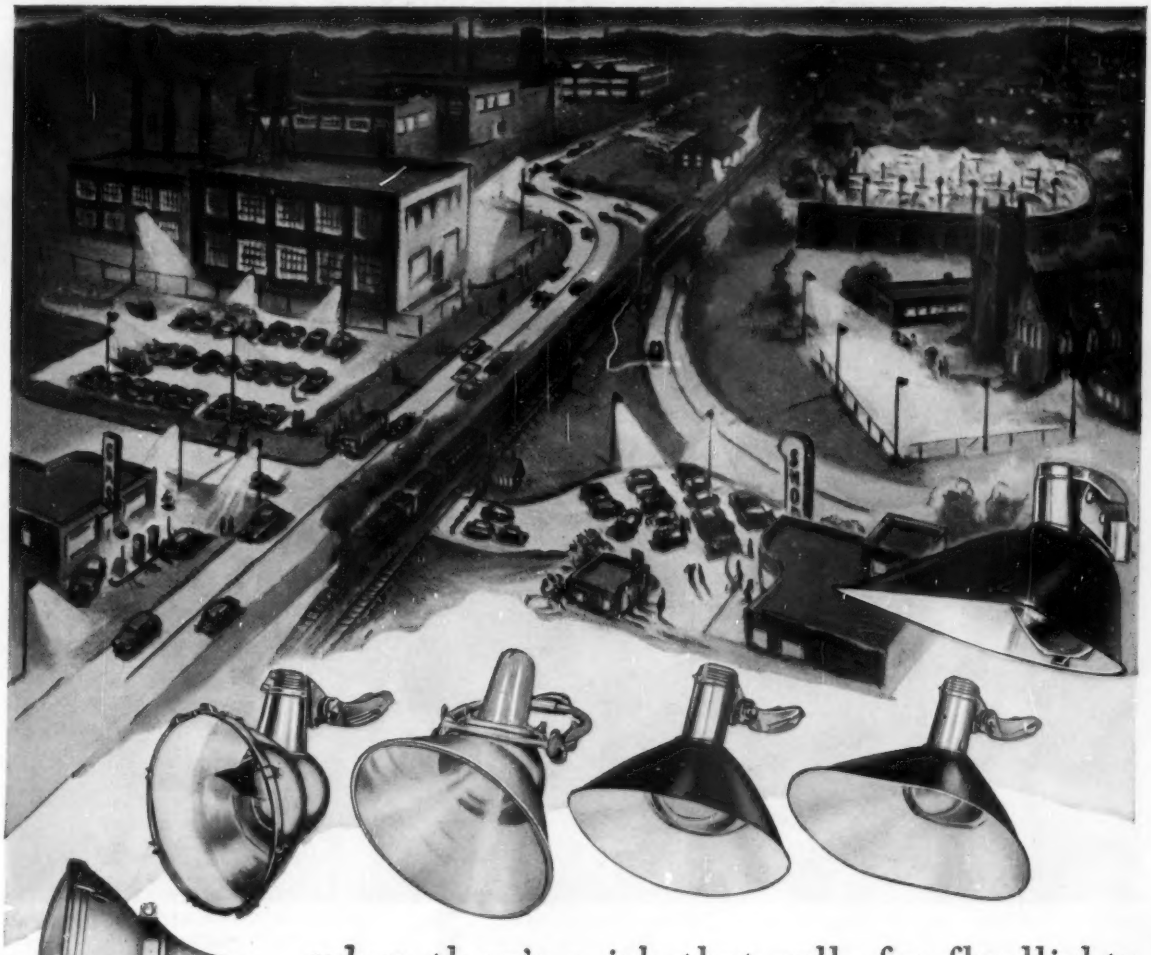
151 **Tool Procurement Plans**—What a plant engineer should know about buying and renting machine tools is told in 8-pp Form 1173. Discusses general aspects of outright purchasing, extended payments and leasing, and depreciation under the new tax provisions. Also explains this company's extended payment plans, three rental plans and gives in-a-nutshell pointers to help determine which plan is best for a particular plant. Gisholt Machine Co.

152 **Welding Process**—This 10-pp bulletin describes a new welding technique, the weld insert process. Tells how this process permits deposition of a root pass which produces a smooth and uniform weld surface even though the actual welding is done on one side only. Bulletin covers applications, compositions, dimensions and detailed specifications. Complete step-by-step information, with sketches and photos, explains how to use the insert and process. Recommended filler metals for finish welding are also listed. Arcos Corp.

153 **Bronze Welding Equipment**—This 20-pp illustrated catalog presents aluminum bronze and phosphor bronze arc welding electrodes, filler rods and coil wire. Illustrated with many photos, booklet provides descriptive information, chemical and physical data and recommended procedures and techniques for welding of steels, irons, bronzes and brass, dissimilar metals; for repairs. Metal & Thermit Corp.

154 **On Intricate Machining**—Form 754 is a 20-pp brochure depicting actual case histories of routine, intricate, and seemingly impossible machining projects. Handsomely illustrated, this booklet explains how individual tooling problems were overcome, minute tolerances met. Connecticut Mechanical Industries, Inc.

(More Bulletins on page 164)



when there's a job that calls for floodlights . . . there's a *BENJAMIN FLOODLIGHT* to do it BETTER!

Whatever your floodlighting requirements, you can rely on Benjamin equipment to do a better job. "*Doing it better*" has been the objective of Benjamin Engineering for over half-a-century. Through the years, Benjamin has pioneered in the use of floodlights in all applications . . . to beautify industrial exteriors . . . to correctly light sports areas . . . to speed up construction . . . to beckon more customers into service stations . . . to facilitate parking for park-and-shop projects, etc. You draw on this vast engineering experience when you specify Benjamin.

That's why you'll find, whatever the floodlighting job, Benjamin Floodlights are time-tested and designed to do it better. They're engineered to deliver sustained performance and original high light output despite continuous exposure to all kinds of weather. Genuine "Life-Time" Porcelain Enamel and "Alzak" Aluminum reflectors simplify upkeep and cleaning of reflecting surfaces. To simplify operation and maintenance, Benjamin Floodlights feature such famous Benjamin engineering refinements as: "Saflox" Floodlight Lowering Devices, patented detachable hood assemblies, convenient pre-setting arrangements and a wider range of brackets and fittings to meet every mounting requirement. Further, every Benjamin Floodlight is specifically designed to meet the requirements of the outside-seeing task with proper shielding, correct light distribution, maximum protection glare and wide range of beam spreads. We will be glad to send you detailed Data Bulletins on any one or all of the floodlights illustrated here. Write Benjamin Electric Mfg. Co., Dept. PE, Des Plaines, Ill.

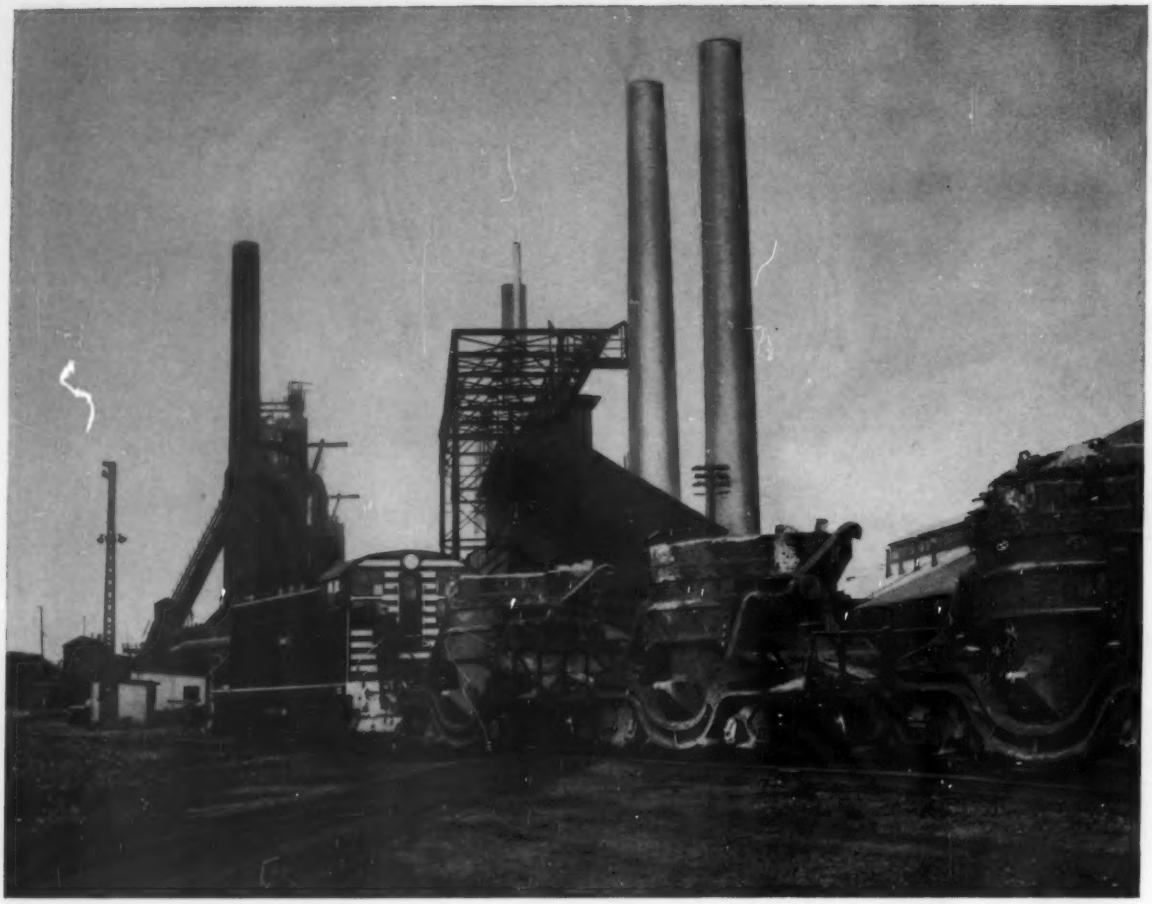
Here are 8 Benjamin Floodlights that do the job BETTER! *(reading from top to bottom:)*

- "Duo-Service" Floodlight
- "Senior Play-Area" Floodlight
- "Ellipto-Lite Play-Area" Floodlight
- "Olympia" Floodlight
- "Alzo-Lite" Floodlight
- "RD" Floodlighting Projectors
- "Utility" Floodlight
- "Cluster-ettes"

BENJAMIN TRADE MARK
Floodlights

Sold exclusively through electrical distributors. B 387

For more facts circle 518 on Reply Card



Sharon Steel reduces operating costs with 6 Baldwin Diesels

The use of six continuously operating Baldwin diesel switching locomotives by the Sharon Steel Corporation at their Roemer Works reduced operating costs. Here is Sharon Steel's report:

"We have found that operating costs are lower with the Baldwin diesels than they were with steam locomotives.

"There is a reduction in operating delay at each turn change time, because refueling and resanding is done only once every three days. Formerly, we took on water, coal, sand and cleaned the fires at each turn change.

"The installation of diesel locomotives has been a large step forward in our air purification program. The elimination of smoke and dirt produced by the steam locomotives entering buildings has greatly improved working conditions. Another improved feature over steam locomotives is the ability of the Baldwin diesel to rapidly generate more air pressure for our air-dumped cars."

If *you* are interested in cutting *your* operating costs, write now for Bulletin DMH-300, to Dept. 1960, Baldwin-Lima-Hamilton Corporation, Philadelphia 42, Pa.

BALDWIN · BLH · LIMA-HAMILTON

BALDWIN-LIMA-HAMILTON

INDUSTRIAL LOCOMOTIVES

For more facts circle 519 on Reply Card

Seven years service for STANOIL Industrial Oil at David Bradley Mfg. Works —No down time for lubrication

L. R. Cummings (left), Standard lubrication specialist, inspects sample of STANOIL, with Robert C. Menken, Plant Engineer of David Bradley Manufacturing Works. Larry Cummings has been serving industrial customers for Standard Oil since graduation from Standard's Sales Engineering School. His mechanical engineering degree from Tri-State College of Indiana qualified him for this work. Customers of Larry's find this experience and background pay off for them.

David Bradley Tri-Trac, handy piece of farm equipment gives farmer new opportunity for mechanization at low cost. Upper frame on which gasoline tank is mounted, is part formed in HPM press.

Seven years ago David Bradley Mfg. Works installed 900 gallons of STANOIL Industrial Oil in an HPM press. There's been no down time required for lubrication maintenance since. A pump by-pass screen filter is the only filtering the oil receives, yet the system continues clean. In March, 1954, an analysis of the oil showed:

Viscosity @ 100° F.	— 980
Color, NPA	— 6
Neutralization No.	— .11

STANOIL Industrial Oil has long been at work for Bradley. Successful operations with it in other equipment caused Bradley engineers to specify STANOIL for this installation.

The HPM double acting, fast traverse hydraulic press reported on here is used to draw the upper frames for the David Bradley Tri-Trac, compact farm tractor. The Tri-Trac is the newest implement in the Bradley line. Bradley has been making farm implements since 1832.

Like to know more about STANOIL? Perhaps it can serve you as efficiently as it is serving David Bradley. Lubrication specialists in any Standard Oil office will be happy to help. In the midwest, a call to one of them will bring a prompt response. Or contact: Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD

STANDARD OIL COMPANY
(Indiana)

For more facts circle 520 on Reply Card

It got mighty cold workin' on gherkins at Durkin's*

Pickle production was way below zero! And so were the pickle packers. Durkin's Gherkins barely crawled to market.

It wasn't temperament—but temperature. Inadequate heating made Durkin's employees inefficient. They weren't getting the pickles out. Even the brine froze solid.

then one day...

Durkin saw an ad like this. It pointed out that *Modine makes every kind of unit heater to solve every kind of plant heating problem*—from pickle works to steel mill, from gas station to box factory.

A man from Modine supplied further details . . . evaluated Durkin's heating needs.

The unit heaters he prescribed worked like a charm. The *warm* folks at Durkin's are hotshot producers now. And of course, the pickle profits are great! *Simply great!*

*Though Durkin's is a fictitious company, its experience illustrates why so many plants standardize on Modine.

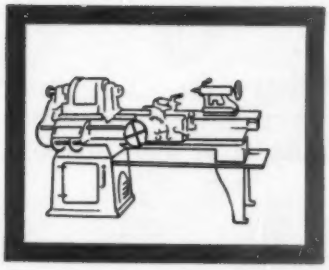
The right unit heaters to fit your needs — FIND THEM AT *Modine*

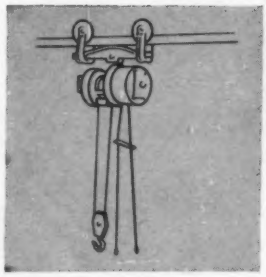
Because Modine is the *quality builder* of all types of unit heaters, you can be sure Modine will prescribe the right installation for your operation. *Want steam or hot water?* Modine offers the widest range! *Want gas?* Modine is right for you—A.G.A. and C.G.A. approved for manufactured, natural, mixed, LP and LP-air.

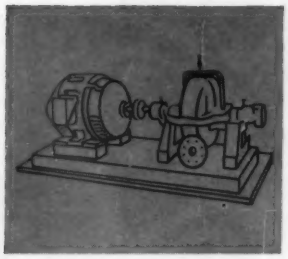
The Modine representative listed in your classified phone book has all details. Or write for Catalog 154 (Steam and Hot Water Unit Heaters) . . . or Catalog 654 (Gas-Fired Unit Heaters). Modine Manufacturing Company, 1563 DeKoven Ave., Racine, Wis.

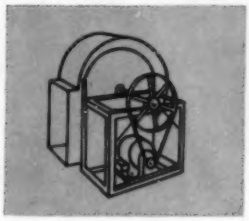
Modine
UNIT HEATERS U-1253

For more facts circle 521 on Reply Card









Match **quality** equipment with **quality** motor power ...specify LELAND!

Buying new pumps, blowers, compressors or other electric motor-driven equipment? Be sure to specify "*equipped with Leland motors*" —to assure maximum efficiency and satisfaction!

Replacing a worn-out motor on present equipment? Then take advantage of this opportunity to *improve* the machine's performance. Replace with a smooth-running, premium quality, long-lived Leland Motor! Call your local Leland dealer or representative.

In choosing motors by Leland you'll be following the example of many leading equipment manufacturers. Write for Bulletin 100 giving data on open and explosion-proof motors from 1/6 to 5 HP.

LELAND Type RA Repulsion Start–Induction Run single phase motor provides high starting torque with low current consumption.

The LELAND ELECTRIC Co.

DAYTON 1, OHIO

Division of AMERICAN MACHINE & FOUNDRY COMPANY, New York

In CANADA, Leland Electric Canada, Ltd., Guelph, Ontario

amf products are better... by design

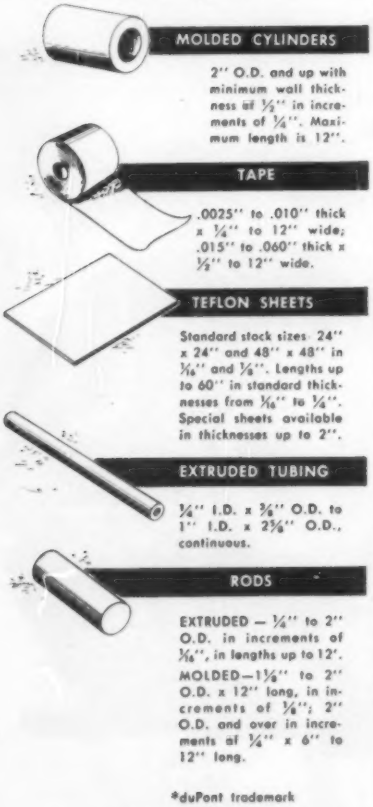
For more facts circle 522 on Reply Card

CHEMPRO TEFLON STOCK of HIGHEST QUALITY VIRGIN POLYMER

You get better, longer lasting parts from Chempro's Teflon* stock, as it is made from only the finest virgin polymer. Cylinders and tape are made from grade TF-5 polymer. This pure, high quality material assures you a denser, more uniform Teflon for greater service life.

For special applications, Chempro Teflon stock is also available glass-filled (FM-2), glass- and carbon-filled (FM-4) or zirconium-filled (FM-8). Our engineering and laboratory facilities are available to help adapt these materials to your needs.

Write for further information.


MOLDED CYLINDERS
2" O.D. and up with minimum wall thickness of ½" in increments of ¼". Maximum length is 12".
TAPE
.0025" to .010" thick x ¼" to 12" wide; .015" to .060" thick x ½" to 12" wide.
TEFLON SHEETS
Standard stock sizes: 24" x 24" and 48" x 48" in 1/16" and ⅛". Lengths up to 60" in standard thicknesses from 1/16" to ¼". Special sheets available in thicknesses up to 2".
EXTRUDED TUBING
¼" I.D. x ⅜" O.D. to 1" I.D. x 2⅝" O.D., continuous.
RODS
EXTRUDED — ¼" to 2" O.D. in increments of 1/16", in lengths up to 12'.
MOLDED—1⅛" to 2" O.D. x 12" long, in increments of ⅛"; 2" O.D. and over in increments of ¼" x 6" to 12" long.

*duPont trademark

THE ORIGINAL FABRICATORS OF TEFLON PACKINGS AND GASKETS

CHEMICAL & POWER PRODUCTS, Inc.

7 Broadway, New York 4, N.Y.

For more facts circle 523 on Reply Card

BACKTALK about our past issues

Edited by R. L. Marinello

Manutention Means Maintenance

PLANT ENGINEERING:

"We have noticed in your September issue, page 99, an article devoted to Accopak pallets.

"We would like, in one of our near future issues, to attract the attention of our readers to this pallet, and are writing to ask if you would find it possible to have made up for us a complete documentation on these materials as well as the photographs." *R. Williaume, Redacteur en Chef, Manutention, 40 rue du Colisee, Paris, VIII, France.*

► We are sending you information which we have available on Accopak pallets, including illustrative material.—*Editors.*

Lukewarm to 200 F

PLANT ENGINEERING:

"It has taken me a long time to answer your letter with the indexes from past issues of PLANT ENGINEERING. With such an excellent selection of past articles, it was difficult to restrain myself from asking for 90 per cent of them. I have marked the ones that will be of prime interest and concern to me.

"I have received the General Electric Company's kit on Productive Maintenance which has been a substantial help.

"Your assistance is greatly appreciated and my enthusiasm for PLANT ENGINEERING magazine has gone from lukewarm to about 200 F." *D. R. Vreeland, Manager, Industrial Engineering, Virginia Metal Products, Inc., Orange, Virginia.*

Cleaning Boilers or Wells?

PLANT ENGINEERING:

"Mr. Brown, assistant superintendent of utilities of Wheeling Steel Corp., Steubenville, Ohio, wrote an article on Cleaning of Boilers, which I think appeared in your August, 1954, issue.

"I would appreciate your checking this and sending me a copy of the issue in which it appears." *E. F. Koch, Cyrus Wm. Rice & Co., Pittsburgh, Penna.*

► An article by Mr. Brown did appear in our August issue, but dealt with the cleaning of wells not boilers. We did have an article on cleaning boilers in our October, 1951, issue. Fortunately, we still have tear sheets of this article available and these are being included with our August issue—*Editors.*

Electrostatic Disc Spraying

PLANT ENGINEERING:

"In your July issue, page 109, you carry an article entitled 'Electrostatic Disc Sprayer Paints Evenly, Saves Money, Too.'

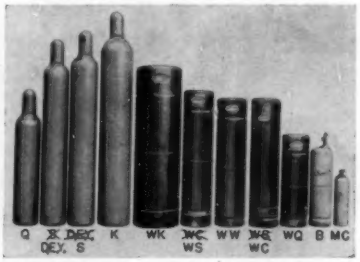
"We would appreciate the name of the manufacturer of the particular electrostatic spraying equipment used by the Eaton Mfg. Co. in the setup described in the article." *I. Phemister, Chief Engineer, Electric Tamper & Equipment Co. of Canada, Ltd., Lachine, Quebec.*

► The electrostatic disc sprayer described in this article is manufactured by the Ransburg Electro-Coating Corp., Barth and Sanders St., Indianapolis, Indiana.—*Editors.*

Pardon Our Error—On Tank Sizes

OUR THANKS to Mr. N. P. Thorson, Pittsburgh District Superintendent, Linde Air Products Co., for pointing out an error in our October issue.

On page 60, the first page of the "Operation and Production" section, "What Size Cylinder Do You Need?"



Corrected labeling on cylinder line-up is indicated below the deleted labels

illustrated the several types of compressed gas cylinders in common use, and tabulated the respective sizes, capacities, and weights. As Mr. Thorson points out, the information would have been fine, if it had been correct. We transposed the designations of four of the cylinders, and we hereby publish the corrected version of the original photograph.

Ultrasonic Equipment

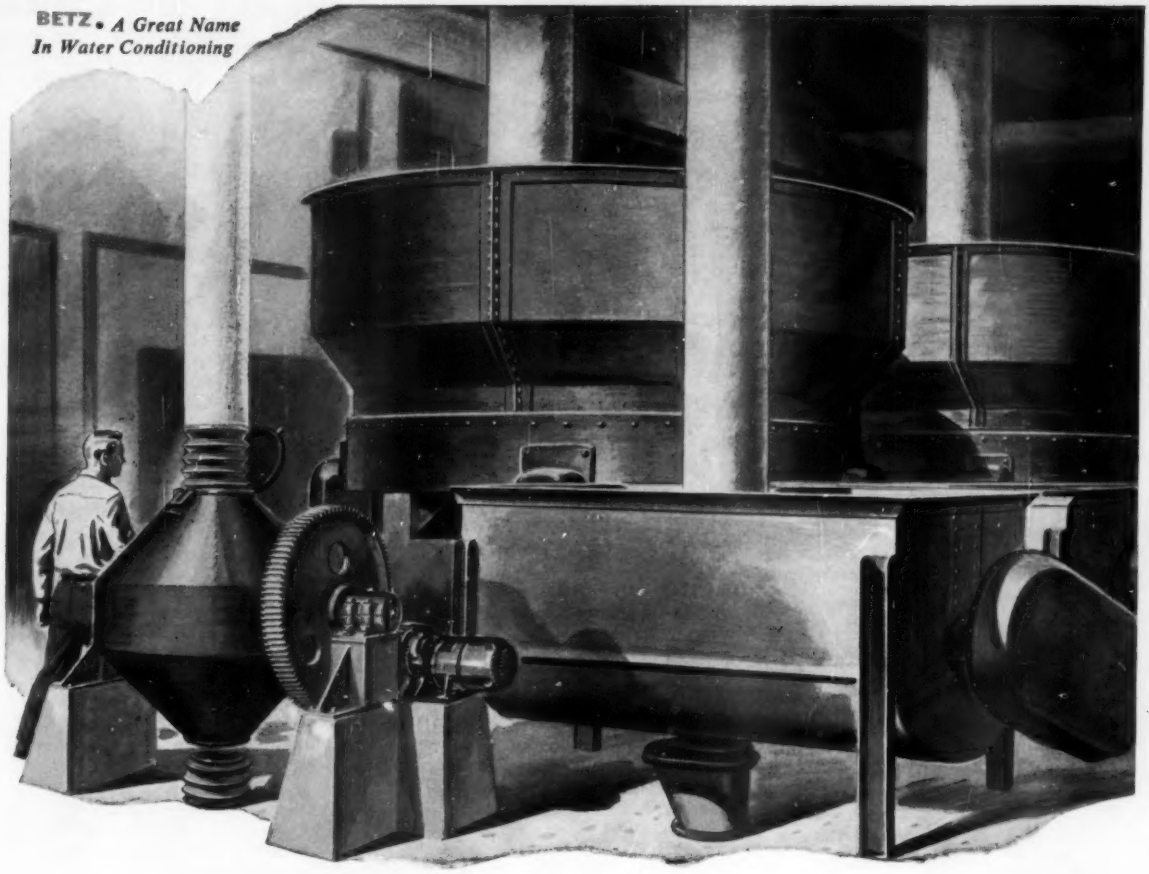
PLANT ENGINEERING:

"I wonder if you could do a little research for me regarding a machine which I understand is made in America. I am in the electronics industry and the machine I am interested in is a cutting machine employing ultrasonics.

"If you could find out anything about this instrument, it would be appreciated. It will not be necessary to supply me with technical details, but I would like to know the name of the manufacturer and if such a machine is in production.

"If this machine, as stated, will cut hard steel, ceramics and glass, then it may be adapted to cut quartz which we are cutting to very close tolerances. The reason I am interested is because we have to make very fine cuts for intricate patterns. Our present cutting methods

BETZ • *A Great Name In Water Conditioning*



If YOU could step into this picture...

. . . you would find yourself in Philadelphia . . . or Texas . . . or California . . . or Montreal . . . in one of the four Betz strategically-located mixing and formulating plants.

Here you would see a battery of giant mixers, whose fingers of steel effortlessly blend and stir thousands of "prescriptions", each formulated to solve some *individual* water conditioning problem for industry. Perhaps you'd notice a special packaging machine, the extremely accurate weighing apparatus . . . or maybe a ton or two of chemicals neatly stacked, ready for formulating.

A little further along, you'd see row upon row of barrels, drums, and boxes ready for shipment . . . each bearing a different contents label.

Perhaps then you'd feel, as many other visitors have, that this division of the Betz Organization *actually performs the function of a giant pharmacy*—the focal point of Betz engineering skill and experience.

And you would profit by your visit, too, since you'd obtain an idea or two on how your plant could operate more efficiently and economically through the use of Betz *completely-integrated* water conditioning service.

W. H. & L. D. BETZ, Gillingham & Worth Streets, Philadelphia 24, Pa.

In Canada: BETZ Laboratories Limited, Montreal 1.

BETZ

CONSULTANTS ON INDUSTRIAL WATER PROBLEMS

For more facts circle 524 on Reply Card

PANGBORN BLASTS by don herold

When those small metal parts call out, "Hey, cleaning time!"
And you have to remove scale, old paint, rust or grime . . .

You can clean them in seconds and save money, too —
Pangborn's Blast Cleaning Cabinet's made just for you.

It produces a finish so smooth and so clean,
It will do the best job that you ever have seen.

Pangborn Blast Cleaning Cabinet

for efficient, low-cost cleaning of metal parts. Cleans pieces up to 35" x 60" in size. Models from $319 and up.

For details, write:
PANGBORN CORP., 3200 Pangborn Blvd., Hagerstown, Maryland

Pangborn

BLAST CLEANS CHEAPER
with the right equipment for every job

50th Anniversary Medallion

For more facts circle 525 on Reply Card

BACKTALK

cause quite a bit of waste and I would be very much obliged if you could supply me with this information." *J. A. Farnath, c/o Eltham, East Post Office, Victoria, Australia.*

▶ There are two companies which we feel may be able to help you on the type of equipment described in your letter. One of these is Cavitron Equipment Corp., 42-26 28th Street, Long Island City, New York. The other is Raytheon Manufacturing Co., Waltham, Massachusetts.—*Editors.*

Drafting Room Standards

PLANT ENGINEERING:

"We are in the process of determining ways and means of reducing costs in our drafting rooms. In addition, we wish to institute drafting room standards.

"Could you inform us of any books that are on the market that deal with the above subjects, aside from the one written by W. L. Healy and H. Rau of the General Electric Co., entitled 'Simplified Drafting Practice'?" *L. S. Shelton, Product Engineer, Signode Steel Strapping Co., Chicago, Illinois.*

▶ We should like to refer you to two publications which may be of some value to you. The first is the book by Frank Zozzora, entitled "Engineering Drawing," published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York, N. Y. The price is $5.00. The other is a booklet covering ASME standards for drawings and drafting room practice. It is identified as Standard No. Z14.1 and is available from the American Society of Mechanical Engineers, 29 West 39th St., New York, N. Y., for $1.50.—*Editors.*

Emergency Pipe Repair Kit

PLANT ENGINEERING:

"On page 86 of the September, 1954, issue of PLANT ENGINEERING you offer to supply additional information concerning repair kits of Fiberglas and polyester resin.

"We are very interested in securing all the information we can, not only on the pipe repair kits but also on the various shapes, types and sizes in which the Fiberglas is available, as well as the variations used in formulating the polyester resin mixes.

"We realize that you may not have all this information on hand and therefore would apperciate your letting us know who the suppliers of this material are." *R. A. Starbuck, Maintenance Engineer, Imperial Paper and Color Corp., Glens Falls, New York.*

▶ We are notifying the Cordo Chemical Corp., New York 17, N. Y., of your interest in receiving additional information on the emergency repair kit. As to more information about the various shapes of reinforced plastic, we suggest that you contact any of the following companies who supply this material in one form or another: Owens-Corning Fiberglas Corp., 16 E. 56th St., New York, N. Y.; Molded Resin Fiber Co., 4000 Benefit Ave., Ashtabula, Ohio; Gateway Glass Co., Inc., 200 Main St., La Crosse, Wis.; and Resolite Corp., Box 517, Zelienople, Pa.—*Editors.*

Seeks Info on Parking Lot Case

PLANT ENGINEERING:

"In the October issue of PLANT ENGINEERING, on page 92 of the 'Court Decisions' series you had an item entitled 'Parking Lot Responsibility,' containing the decision of the Supreme Court, State of Alabama.

"We would appreciate your giving us the number of the citation and/or court action, date, etc., containing the full text of this decision." *T. J. Trodden, Office of the Secretary, San Francisco Garage Owners' Association, Ltd., San Francisco.*

▶ We are asking Mr. Albert Woodruff Gray, who collects this material for us, to send you full particulars.—*Editors.*

Query on Glassy Phosphates

PLANT ENGINEERING:

"We have recently come across 'Construction Briefs' by Byron A. Engelbach. Going over past issues we find that we are missing the May, 1954, copy. Is it possible for us to obtain this copy?

"Our company wishes to use glassy phosphate in the treatment of our wells. We consulted our chemist and sent him the article 'Water Well Cleaning with Glassy Phosphates' that appeared in your August, 1954, issue. He has informed us that glassy phosphate is made up in four different formulas. Can you supply us with the name of the manufacturer of glassy phosphates?" *Conrad Proebstle, Atlantic City Ice & Cold Storage Co., Atlantic City, New Jersey.*

▶ We are sending you a copy of the May, 1954, issue of PLANT ENGINEERING with our compliments. The manufacturer of the glassy phosphates, the use of which was described in the August article, is Calgon, Inc., a subsidiary of Hall Laboratories.—*Editors.*

Floor Mastic

PLANT ENGINEERING:

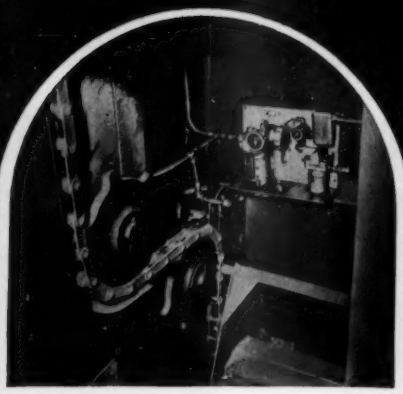
"In your October issue, page 98, there was a very interesting article describing the use of a floor mastic by the Caterpillar Tractor Co. The name of the product was Permaflex.

"We are wondering whether you could give us any information as to the manufacturer of this product and, if possible, their Canadian distributor." *D. E. Hibbard, Engineering Dept., H. J. Heinz Co. of Canada, Ltd., Leamington, Ontario.*

▶ The manufacturer is: Permaflex Products Co., 1846 North Front St., Philadelphia 22, Pennsylvania.—*Editors.*

For more facts circle 526 on Reply Card →

telling the story of 'dag' dispersions



Dry-Film Lubricants Resist Heat and Chemicals

Where conventional lubricants fail . . . on oven conveyors, bearings of kiln-car wheels, conveying equipment for hot strip steel or for degreasing tanks where most lubricants are destroyed . . . 'dag' Colloidal Graphite provides a durable, heat-proof, *dry lubricating film.* This remarkable film is unaffected by heat up to 750° F., and is fully effective under most conditions at much higher temperatures.

'dag' Colloidal Graphite is produced in a variety of liquid carriers . . . water, oils, volatile hydrocarbons, resin-solvent combinations . . . formulated for a wide range of industrial needs.

If your operations impose severe conditions upon the lubricants you are now using, send for helpful details of the remarkable 'dag' dispersions in Bulletins No. 424-A0 and No. 435-A0.

Dispersions of molybdenum disulfide are available in various carriers. We are also equipped to do custom dispersing of solids in a wide variety of vehicles.

Acheson Colloids Company

Port Huron, Michigan

...also ACHESON COLLOIDS LIMITED, LONDON, ENGLAND

try 'dag' resin-bonded dry films for permanent lubrication

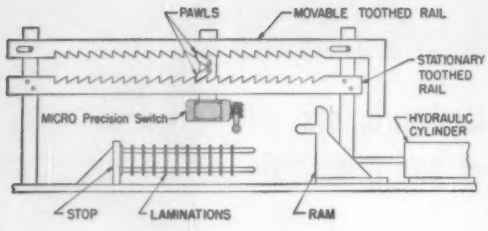
dag DISPERSIONS

MICRO SWITCH Precision Switches
A PRINCIPLE OF GOOD DESIGN

"There's gold in them thar switches"

as many a plant engineer has found . . .

THE JOB

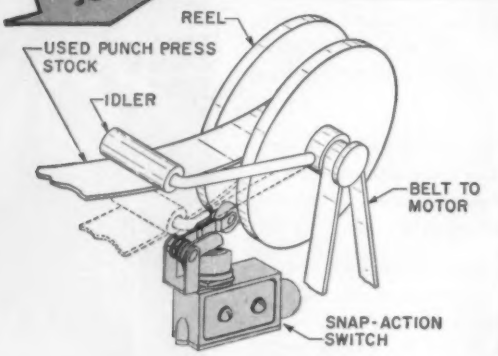


THE SWITCH

This switch spaces laminations automatically

This switch moves backward a notch at a time so that each forward movement of the ram accurately spaces laminations on this coil building machine.

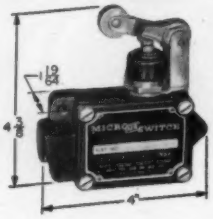
THE JOB



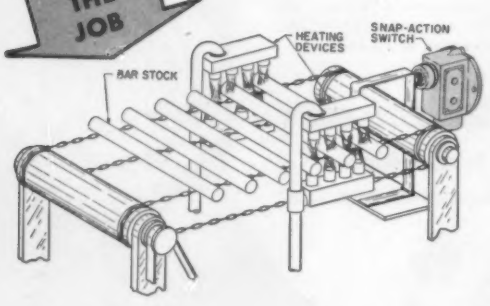
THE SWITCH

This switch operates motor so reel winds tight

Slack of the stock fed to this scrap reel drops the idler, actuates the switch and motor operates until slack is taken up.



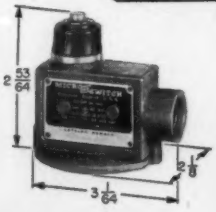
THE JOB



THE SWITCH

This switch keeps bar stock positions in furnace

When bar is in proper position in these slot furnaces, the center of the bar trips switch and stops conveyor. When the bar is removed the conveyor runs again until the next piece is in place.



Call your MICRO SWITCH *Distributor. Look in the yellow pages of your phone book. Ask for Catalog No. 101.*

Write for MICRO TIPS
This publication will show you how to make your plant safer, more automatic—more productive—with precision switches.

MICRO SWITCH

A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY
In Canada, Leaside, Toronto 17, Ontario • FREEPORT, ILLINOIS

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For more facts circle 528 on Reply Card →

Visit the Rohm & Haas Company exhibit, Booth 348, at the Plant Maintenance and Engineering Show, International Amphitheater, Chicago, January 24-27.

These Plexiglas windows save $400 a year

In 1952 the Keystone Refining Company glazed all the windows of this plant building in Philadelphia with breakage-resistant PLEXIGLAS. Recently Mr. Fred H. Detrick, president, reported: "We have not spent one cent for window replacement since installing PLEXIGLAS. Previously, breakage cost us approximately $400.00 per year."

In addition to reducing glazing maintenance costs to a minimum, PLEXIGLAS acrylic plastic:

- protects employees, machinery, and products from the dangers of broken windows.
- is available in translucent and transparent colors for the control of sky glare and solar heat.

We will be glad to send you the names of dealers in your vicinity. Local sources of supply are also listed, under PLEXIGLAS, in the classified telephone directories of many cities.

PLEXIGLAS is a trademark, Reg. U.S. Pat. Off. and in other principal countries in the Western Hemisphere.

Canadian distributor: Crystal Glass & Plastics, Ltd., 130 Queen's Quay at Jarvis Street, Toronto, Ontario, Canada.

Ask About PLEXIGLAS R

Our new, lower-priced cast acrylic sheet, PLEXIGLAS R, is especially suitable for industrial glazing. Ask your dealer about it, or write to us.

CHEMICALS FOR INDUSTRY

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

PLANT ENGINEERS' DIGEST so those who rush may read and know what's new

Edited by M. E. Weissman

Patched Pipe

A PLASTIC PATCH that has the simplicity of a first-aid bandage can be applied to a ruptured pipeline in 15 to 20 min. The complete piping system can be put back into operation within 30 min of applying the patch.

The metallic pipe patch is composed of synthetic resin and activator, a void cover, fibrous glass tape, and a bonded fibrous glass matting. The void cover is a cloth woven of glass fibers that has been treated with a synthetic resin and is used to cover the rupture first. The tape and mat are impregnated with the activated synthetic resin to provide the adhesive bond of the patch. The retaining cover, which completes the patch, is made of kraft wrapping paper. This is tied in place.

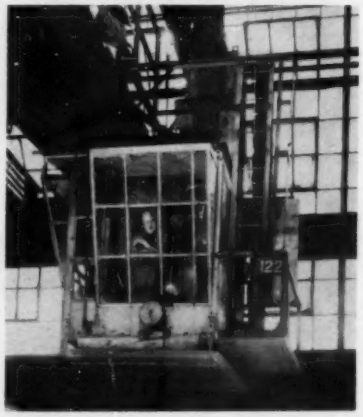
After the patch is applied, a chemical reaction results in thermal radiation and temperature rise. At normal room temperature this rise is gradual until it reaches 120-135 F. At this point it accelerates rapidly until, within a matter of seconds, it reaches 350 F. From then on, the patch begins to cool and solidify. Room temperature has a considerable effect on the time required for the patch to harden.

The patch can be applied on most types of pipeline breaks, including a severed section of pipe; on a curved section, and on a compound break with protruding edges. It can be used on fresh or salt water piping whose pressure does not exceed 300 psi, or whose temperature is not above 200 F. Tests are being conducted to determine how the patch can be applied to lines carrying steam, gasoline and other material. *From Navy Technical News, published by Office of Information, Department of the Navy.*

Conditioned Cab Spurns Heat

ONE OF THE PROBLEMS of working in a crane above heat treating areas is the effect of heat and fumes on the crane operator. At Taylor Forge & Pipe Works, Cicero, Illinois, temperatures in these areas are constantly around 140 to 160 F, but soar to 1000 to 1100 F when the special dome-shaped ovens are open. Even with an enclosed cab, the crane operator could work only long enough to remove the material from the oven and then would have to scramble from the crane. This resulted in discomfort to the operator and much crane downtime.

Another problem was the fumes from the ovens and oil quench bath. During the winter when the ovens switched from gas to oil firing, the situation was much worse.

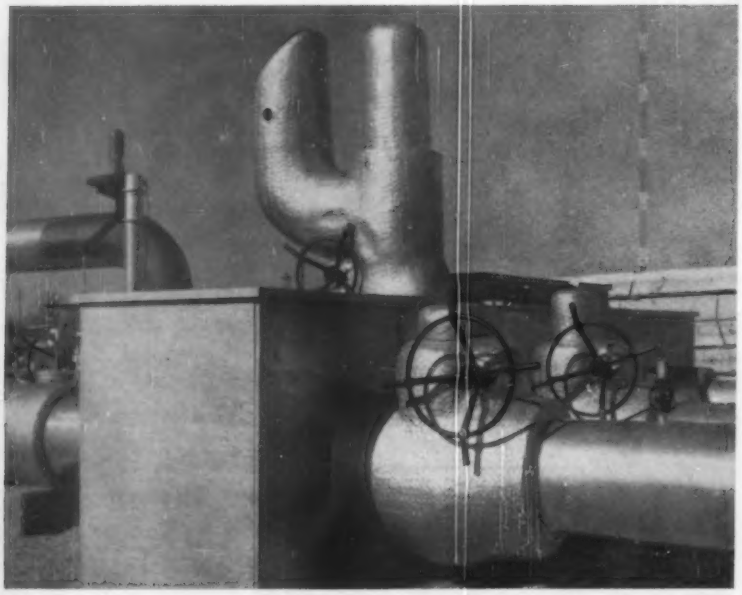


Conditioning crane cab gives greater operator comfort, higher production

Our company decided to eliminate all these problems by installing a cab conditioning unit on the crane. The unit selected was completely self-contained with a three-ton cooling capacity. It provides ventilation, dust, dirt, fume and odor removal.

(Continued on page 36)

Glass Wool and Acoustic Board Quiet a Regulator, and Keep a Neighborhood Happy



How regulator looked after it was swathed in glass wool and acoustic board

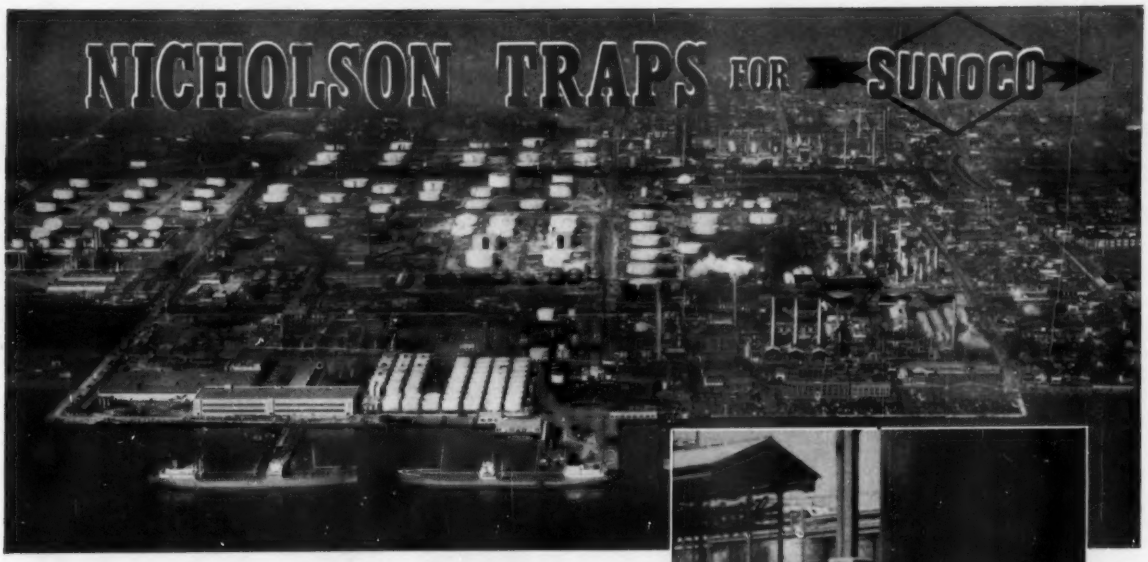
A SOUND-REDUCING operation on a regulator that had disturbed nearby residents and employees in a plant, succeeded in making the noise barely audible 125 ft away from it.

The gas pressure reducing station consisted of four 10-in. tubes with a 6-in. regulator at the downstream end of one of the tubes. This was the only tube in use.

The orifice flanges were accessible from a narrow pit and the 16-in. downstream header connecting the 10-in. tubes was in an open concrete pit. This pit also contained the downstream 10 ft of the tubes connecting the 16-in. header.

To reduce the noise, a square, wood frame was built around the header, leaving a space of about 8 in. between the pipe and the framework. A 1-in. sound-absorbing board and a protective outer layer of ¼-in. plywood were fastened over the frame, and the space between was filled with glass wool. *From The Flowline, published by Rockwell Mfg. Co., Pittsburgh, Pa.*

NICHOLSON TRAPS FOR SUNOCO



Air view of Sun Oil Company's refinery at Marcus Hook, Penna.

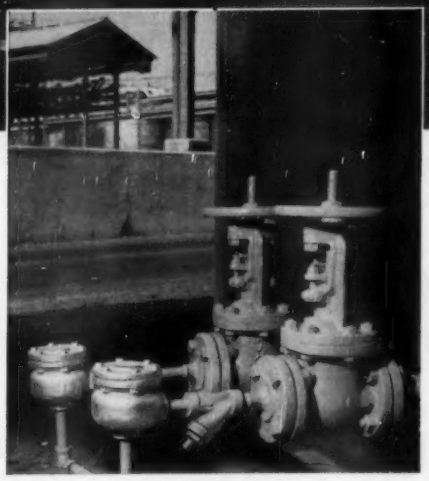
Standard for

OUTDOOR USE

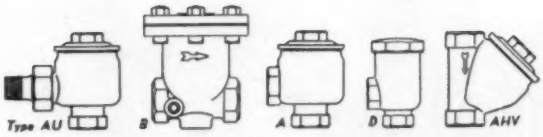
Due to

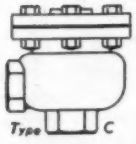
FREEZE-PROOF

Feature



Nicholson steam traps are shown above installed on storage tanks requiring heating at Sun Oil Company's Marcus Hook, Pa., refinery. Sun has standardized on this type of installation.





SIX TYPES FOR PROCESS, HEAT AND POWER -- Construction of bronze, semisteel or cast steel. In sizes of ¼" to 2" for pressures to 300 lbs. All six types of traps have stainless steel valves and seats. Bellows are furnished in bronze, monel or stainless steel.

W. H. NICHOLSON & CO.

TRAPS · VALVES · FLOATS

208 Oregon Street, Wilkes-Barre, Pa.
Sales & Engineering Offices in 58 Key Cities

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PLANT ENGINEERS' DIGEST

(Digest begins on page 34)

Because of space limitations, the unit was installed vertically, on top of the crane cab. Return air is drawn from the cab floor through a bank of activated carbon filters to clean it, after which the air is cooled. A sufficient quantity of make-up air is provided by infiltration of the cab.

According to Plant Engineer Harold G. Love, conditioning the cab has made it possible to increase the heat load in the area and to keep production schedules which otherwise might not be possible. *From a release of Dravo Corporation, Pittsburgh, Pa.*

Tank Built Without Steel

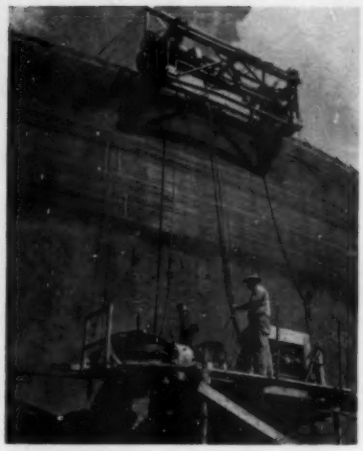
FIVE HUNDRED MILES of wire and 1100 yards of concrete were utilized in the construction of a pre-stressed, five million gallon water tank in Oakland, Calif.

The wire was used to stress the concrete, vertically and horizontally, instead of employing reinforcing steel in the construction. This method is said to make a stronger tank, less prone to leakage than the reinforced type.

In preparation for the stressing, vertical stress rods are placed around the circumference of the tank when the walls are poured. Within each rod are six wires, doubled over at the bottom to form 12 strands. These are anchored.

Actual stressing starts when the concrete has set up to 4,500 psi. A stressing jack on top of the wall exerts a 175,000 psi pull on the wires. Then a grout, consisting of sand and cement, with 12 sacks of cement to the yard, is pumped through the stress tubes. The grouting sets up and locks the wire in place.

The horizontal stressing is done by a wrapping machine that travels around the top of the tank at 7.1 mph. As it does so, it puts a 140,000 psi tension of the horizontal stressing wire, enough to reduce the diameter of the wire from 0.162 to 0.138 in.



Wrapping machine travels around tank applying wire to stress the concrete

This first layer of wire is covered by a ¼ in. layer of gunite, then by

(Continued on page 38)

Bent Gear Straightened with Flame Treatment Is Returned to Work

A CAST-STEEL GEAR which was bent while pressing it onto a pivot shaft, was straightened by flame treating and returned to service. Several earlier attempts to straighten the gear resulted in distortion of the 7-in. shaft, and this misalignment was repaired by flame-shrinking.

The gear was from ⅜- to 7/16-in. out of line; three of the six spokes were bent to one side, and three were bent in the opposite direction. Because of the herringbone cut of the gear teeth, it was necessary to true the gear to within 0.012 to 0.015 in.

The gear was supported in an upright position with two opposite spokes in a vertical line. Top spoke was inclined toward the long part of the shaft. Nominal pressure was exerted by a jack and "stiffleg" to prevent slack when the gear expanded from the heating process.

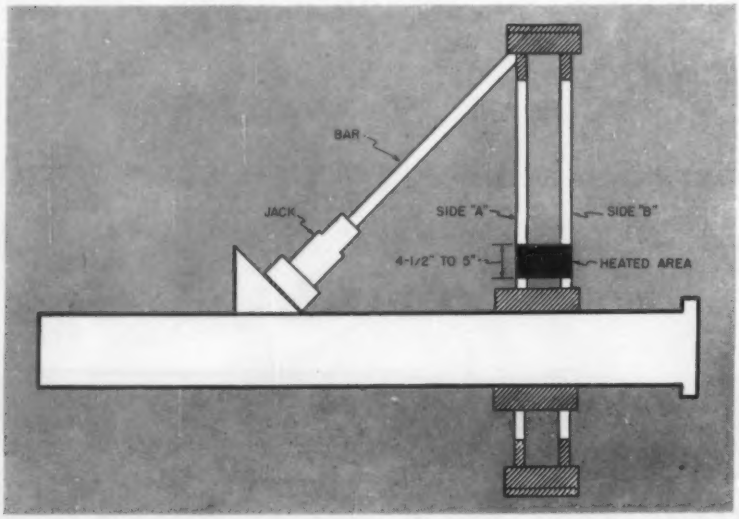
The entire cross section of the spoke was heated with a blowpipe flame. Then side A was cooled with the air-water quench. This placed the web of the spoke and side B in compression while still red hot.

Side A was kept cool with the quench until the entire heated section had cooled. This moved the gear rim ⅛-in. toward correct alignment, so the procedure was repeated for the remaining two spokes that were bent toward the long part of the shaft.

To align the three spokes that were bent in the opposite direction, a small chain block was substituted for the bar and jack and a pulling force was exerted on each of the spokes in turn. The heating and quenching procedure was reversed. After repeated heatings, the gear was brought to within 1/16-in. of alignment.

A strip 1 in. wide and 7 in. long in the center of each spoke was next progressively heated and quenched. Two blowpipes were used for the heating, starting at the hub and moving toward the rim, with the quench following the second flame closely.

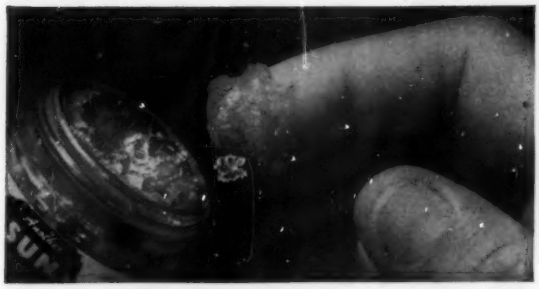
When the gear was within 1/64-in. of true, some of the shrunken areas were peened lightly. The gear rim was checked constantly throughout this operation, and when it was within 0.007 in. of true, it was ready to be returned to work. *From Linde Tips, published by Linde Air Products Company, New York, N. Y.*



Bent gear was positioned by jack and "stiffleg" to prevent kinking during heating

THESE 3 SUN GREASES WILL DO 95% OF YOUR GREASE LUBRICATION JOBS

—save you the cost and trouble of stocking a large number of "special purpose" greases



FIBROUS • Sun Grease 844X

Has exceptional oxidation stability under high temperature conditions. Recommended for all antifriction bearings. A general-purpose, high melting point lubricant for pressure gun and grease cup application.

BUTTERY • Sun Grease 300A

Especially designed for pressure lubrication of bearings operated at normal speeds and temperatures. Can be used in pressure guns, compression grease cups, or pressure lubrication systems. Has high water resistance and excellent pumpability at low temperatures.

TACKY • Sun Grease 897

For open gears, chains, slides, cams, linkages and bearings. Used whenever "throw-off" must be avoided. High adhesive and cohesive characteristics. An excellent lubricant that is water resistant and does not need frequent application.

Of the 81 different Sun greases, these three can fill the vast majority of your needs. And lubrication simplification like this means worth-while economies for you in several directions. You can reduce the total amount of money you need to "invest" in lubricants. You can greatly lighten the housekeeping job of storing and handling your greases. And you can reduce the confusion and risk of error often created when personnel are required to choose from a large number of greases.

For lubrication points that do require special kinds, Sun offers a total of 78 other greases with a wide range of properties and characteristics.

Find out just how much you can economize by using Sun lubricants. Call in your Sun representative. Or write for information. Dept. PY-1.

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

SUNOCO®

PHILADELPHIA 3, PA. • SUN OIL COMPANY LTD., TORONTO & MONTREAL

Refiners of famous High-Test Blue Sunoco Gasoline

For more facts circle 530 on Reply Card

New Hetron*-Based Self-Extinguishing "FIRE-SNUF" Panels by RESOLITE

A blow-torch applied directly to edge of a Resolite Fire-Snuf translucent structural panel slowly ignites the resin and small flames appear.

The blow-torch is turned aside, and five seconds (note stop watch) after source of heat and flame is removed fire on the Fire-Snuf panel is self-extinguished.

When building codes require a flame spread rating under 75 you can now specify Resolite Fire-Snuf translucent panels for plant daylighting.

These panels are molded of fiberglass and HETRON*, a permanently fire-resistant resin, manufactured by Hooker Electrochemical Co.

Fire-Snuf panels, with flame-resistance chemically locked-in, are just as shatterproof and retain all the other features—high strength, stability and load bearing characteristics—which have made Resolite the most popular new material for plant daylighting.

Fire-Snuf is available molded in all standard Resolite corrugations in lengths up to 13 feet and widths up to 42 inches.

For additional information on Fire-Snuf, see Sweet's Files, consult your distributor or write:

RESOLITE Corporation

Box 517, Zelienople, Pa.

Distributors in principal cities, U.S. and Canada

For more facts circle 531 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 34)

successive, similar layers of gunite and wire. The last layer of wire is covered by a 4- by 4-in., 13-gage, galvanized welded wire fabric, in turn topped by a final application of gunite.

It was estimated that the 37-ft high, 162-ft OD tank, built by Elmer Freethy, cost $10,000 less to build than a conventional tank of the same size. *From This Earth, published by Henry J. Kaiser Company, Oakland, Calif.*

Sprinklers in Glass Industry

OILY DEPOSITS, formed in one method of making glass containers, are responsible for most of the fires involving glass machine buildings in glass manufacturing plants.

In this particular method of making glass containers, molten glass is dropped into metal molds on automatic machines. The molds are coated with paraffin oil to prevent the glass from adhering to the mold. Upon contact with the molten glass, the oil vaporizes, rises, and condenses on columns, ventilators and ceiling, where, mixed with lint and carbon dust, it forms a highly combustible deposit.

Because of high temperatures under the roof, these deposits cannot be cleaned away except when the furnaces and machines are shut down. This usually occurs at one- to three-year intervals.

Potential fire damage could be reduced by use of automatic sprinklers, but the glass industry objects to these for fear of accidental water damage to the machinery.

Owens-Illinois Glass Company, Oak-

Electricity and Lighting In Hazardous Atmospheres

A HERMETICALLY SEALED electrical installation with an internal air pressure of about 5 psi is said to eliminate the danger of operating electrical equipment in atmospheres containing inflammable gases and vapors.

If the installation is damaged, the release of the internal air pressure momentarily blows the inflammable gas away from the leak. Simultaneously, the electric current is switched off automatically. The current supply in the area is available only as long as the internal air pressure exists, since the pressure serves to maintain a switch in the "on" position.

The micro-switches, upon which the system is dependent, are each held in contact against a spring bias and kept closed by the positive air pressure within the system. The electric circuit is made through all the switches in the system, which are connected in series. Should any one switch open, the current is cut off by the control relay tripping the circuit breaker.

This pressurized system, introduced by General Electric Company, Ltd., is useful for controlling a portable lamp, pressurized in a similar manner. Lamp fitting and 60-ft hose are made of neoprene. The hose has three compartments; two provide separate channels for the pilot and lighting wires, the third provides rigidity of construction so that the hose will not collapse and throttle the air supply.

The lighting system can be adapted for various designs of tungsten and fluorescent fittings. *From Scientific Lubrication, published by Scientific Publications, Brosely, Salop, England.*

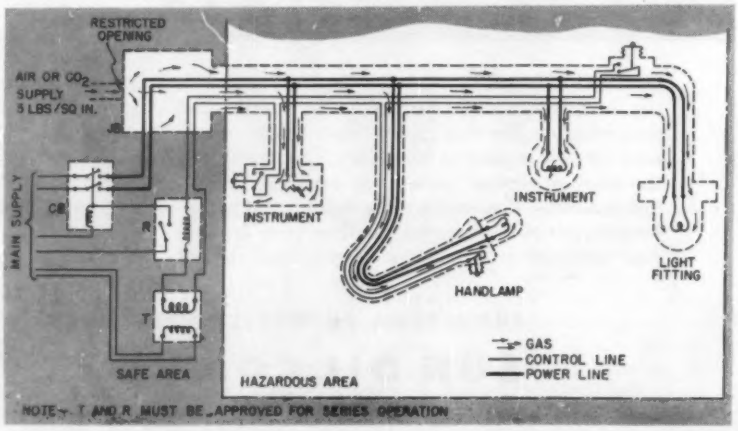


Diagram shows electrical system designed for use in hazardous atmospheres

land, Calif. plant installed a non-automatic system of water spray nozzles at the roof, and in the ventilator. The result was, that in a subsequent fire in the glass machine building, damage was one fifth of that in the previous fire. In the latest fire, the spray nozzles were turned on promptly, the fire was extinguished immediately, and there was no damage from water falling on the machines. Production was interrupted only seven minutes. *From Factory Mutual Record, Factory Mutual Engineering Div., Boston, Mass.*

Mirrored Safety

Twenty-four-inch parabolic mirrors are proving their worth at dangerous intersections. Suspended from ceiling, they permit fork truck drivers to see around corners. (From Maytag Bulletin, published by Maytag Co., Newton, Ia.)

Radioactive Salt Traces Leaks

WHEN PLANT ENGINEERS at a Toronto plant found that insufficient water from the steam traps of radiators was making its way back to the boilers, they suspected leakage somewhere along the 300 ft of return line. The inch-and-one-half pipe was buried beneath 6 in. of concrete floor and at one end sloped so that an additional 18 in. of soil covered it.

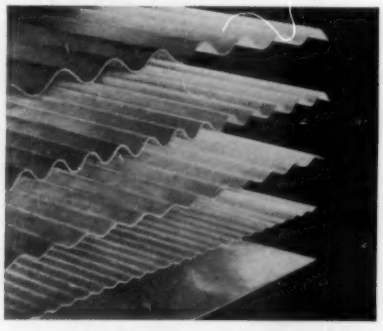
To "sniff out" the suspected leaks a radioactive solution was run through the pipe. For this, Bromine 82, in the form of potassium bromide, a salt easily soluble in water, was chosen. It has a short half-life of 36 hr, necessary in order that the soil around a leak would not be indefinitely contaminated.

After the radioactive potassium bromide, dissolved in 12 gal of water, was pumped through the line, its

Your plant windows will never have to take this "torture test"

NEW FIRE-RESISTANT PLASTIC makes possible rugged, shatterproof translucent glass fiber panels for plant windows, skylights, partitions, stair wells. Blowtorch flame blackens this window panel, but doesn't make it burn freely. See how burning stops when the flame is removed. Panel contains HETRON®, a new resin that doesn't support fire.

IF YOUR BUILDING CODE calls for a flame spread rating under 75 you can meet the requirement with a HETRON-based panel. You can get panels with ratings of 75, and lower—equivalent to the Building Officials Conference of America classification of "slow burning" or "flame retardant."



YOU CAN SELECT rugged, nonshattering, fire-resistant sheets made with HETRON, in a full range of sizes, gauges, colors; corrugated or flat; translucent or opaque. We'll be glad to tell you which sheet-makers can supply you. Write also for test data and pictures, plus descriptive information on HETRON resins.

HETRON is made by Hooker

From the Salt of the Earth

HOOKER CHEMICALS

HOOKER ELECTROCHEMICAL COMPANY

27 UNION ST., NIAGARA FALLS, N. Y. 4-2448

NIAGARA FALLS TACOMA MONTAGUE, MICH. NEW YORK CHICAGO LOS ANGELES

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Yes, Dart Unions fit tighter and last longer because their two bronze seats are precision ground to a true ball joint. You get a drop-tight connection without straining arm, wrench or union. What's more, a Dart uncouples just as easily. Ask your supplier.

QUICK FACTS

- Extra wide bronze seats resist pitting and corrosion.
- Nut and body of air-refined, high test malleable iron are practically unbreakable
- Heavy shoulders can withstand the toughest wrench abuse
- Each Dart is individually vacuum-tested

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Providence 5, Rhode Island
The Fairbanks Co. Distributors
Boston•New York•Pittsburgh•Rome, Ga.

DART UNIONS

For more facts circle 533 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 34)

course was surveyed with a detector. At five places along the line there was an unusually high radioactivity reading. The line was then pumped out and flushed with water. High readings were still noted at the same five locations because the radioactive solution that had leaked from the pipe and seeped under the concrete, remained when the pipe was cleaned. These locations were marked.

Repair men waited long enough for the radioactivity to virtually cease, then broke through the marked locations and repaired the line. *From Canadian Isotope Newsletter, published by Isotope Products Ltd., Oakville, Ont.*

Selecting Paper Towels

THERE ARE FIVE characteristics which should be present in paper towels if they are to serve their intended purpose, and they should be checked carefully when making a selection.

First consideration is absorbency. Both the rate of absorption and total absorption are important. The towel should have an inherent ability to remove water quickly and completely.

Wet strength, provided by addition of chemicals to the paper during manufacture, gives the towel the ability to remain in one piece until the hands are dry.

Softness gives a pleasant "feel" to the towel, which should not become slimy when wet. In use, it should be comfortable and easy on the skin.

Freedom from lint is another important characteristic, as is lack of odor when the towel is wet.

Generally, a brown color indicates the use of cheaper grades of fiber, and consequently a lower quality product. *From Westwinds, published by West Disinfecting Company, L. I., N. Y.*

Preventive Maintenance And Burned Boilers

MODERN SAFETY controls are good, but they are not human, and they do not take care of themselves, a study of boiler accidents during a recent year, shows.

In that year, 153 boiler accidents were caused by loss or deficiency of water and failure or malfunctioning of protective or control devices and auxiliary equipment.

Absence of operating personnel at

Reduce HOT WATER *Generation Costs* . . .

with the new

A.O.Smith Burkay "718"

HIGH RECOVERY WATER HEATER

Significant cost reduction in the heating of hot water for many plant needs can be made with the A. O. Smith Burkay System of Water Heating. A new addition to this famous line is the "718"—the water heater with "big job" capacity: 403 gallons per hour at 100-degree temperature rise, with an input rating of 420,000 BTU per hour!

By installing a "718" you can cut back the operation of your expensive boilers, reduce the size of your boilers; or in some cases dispense with them entirely . . . thereby reducing overhead, labor and maintenance costs. Furthermore, the large capacity of the "718" reduces the need for multiple heater connections.

For the plant restaurant, the Burkay "718" with the A. O. Smith patented Booster-Recovery System provides water at two temperatures simultaneously: 140 degrees for general-purpose needs and all of the 180-degree sanitizing rinse required by health authorities for the rinsing of dishes.

Packed with exclusive A. O. Smith design features that provide: all copper construction for clean, rust-free water; full combustion efficiency; accurately controlled water temperatures; instant response to hot water needs—this high recovery unit gives you *more hot water* at the *right temperature* for *less money* in *less time!*

Call the nearest A. O. Smith distributor for the full details; or write for Model "718" Specification Sheet.

"Plenty of Hot Water Pays All Ways"

Trend in plants is to heat water with gas . . . Learn how A. O. Smith can help you save money!

LET'S GET ACQUAINTED

See you at the

Plant Maintenance and Engineering Show

JANUARY 24, 25, 26, 27

Chicago International Amphitheater, Chicago, Illinois

A. O. SMITH BURKAY EXHIBIT

BOOTH No. 686

Through research ...*a better way*

A.O.Smith CORPORATION

PERMAGLAS DIVISION • KANKAKEE, ILLINOIS

For more facts circle 534 on Reply Card

To PREVENT VIBRATION trouble later...

...See KORFUND NOW!

→

Korfund Steel Spring Vibro-Isolators installed without bolting to the floor under these presses at Wells Specialty Company, Inc., North Liberty, Indiana, permit rapid rearrangement of production lines. Effective Korfund Vibration Control also permits press operation at considerably higher than rated speeds without vibration—something the simple felt pads previously used by Wells Specialty Company could not do. (Since the 200 ton press at left requires a pit for its pneumatic cylinder, the Vibro Isolators are installed below floor level.)

←

A Four-Time Loser! After four different schemes for controlling vibration of their 180 ton capacity press were tried at a cost of well over $1,000.00, without success, Sterling Industries Inc., Philadelphia, called in their local Korfund representative. Four standard Korfund Steel Spring Vibro-Isolators installed directly under the press solved the problem. Total cost—$332.00.

ALL KORFUND STEEL SPRING VIBRO-ISOLATORS HAVE ADJUSTABLE LEVELING BOLTS...A KORFUND FEATURE FOR OVER 30 YEARS!

When dishes rattle and plaster cracks in homes near your plant, as happened in the two cases described above, you know your vibration control equipment is not effective. Usually your neighbor's attorneys will suggest you do something about it. Many problems such as this, as well as those involving interference with precision machinery in the plant, damage to the building structure or the press itself, etc., are brought to Korfund for solution.

We usually find the trouble lies in depending on one type of Isolator to do the job. We believe one product or even one type of product cannot solve all vibration problems efficiently and economically. We make several different types—each one designed for a particular set of conditions.

That's why when you bring your vibration problem to Korfund, you get our impartial recommendation on isolation media whether it be springs, rubber, or cork—alone, or in combination. We have all three—we favor none. Our only interest is your satisfaction.

For your free equipment isolation Selector Chart and additional data on increasing production and reducing costs, write for copy of Bulletin 21, or see our catalogue in Sweet's Files.

See us at Booth 206 at the Plant Maintenance Show Chicago—Jan. 24-27

THE KORFUND CO., INC.

KORFUND VIBRATION CONTROL — SPRINGS | RUBBER | CORK

48-35R Thirty Second Place, Long Island City 1, N. Y.

In Canada: 510 Canal Bank, Ville St. Pierre, Montreal

For more facts circle 535 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 34)

the time of the accident plus lack of proper routine maintenance on the controls, was the chief personal cause of these accidents.

More than 85 per cent of the 153 boilers were equipped with one or more automatic controls, such as low water alarm, low water fuel-cutoff, or feedwater regulator. At least 65 per cent of them were protected by either a low water fuel-cutoff, or a low water alarm, or both. Damage in most of the

Badly burned tubes of watertube boiler show the damage caused by low water

boilers was due to overheating or burning the boiler parts.

No matter how good a control is, operation depends on maintenance.

A float in a water control float bowl can not rise and drop as it should, if the float chamber is blocked by sediment. A mercury switch can not make and break contact at the proper point if the control is not mounted level or plumb; nor can it be expected to operate properly if it has been subjected to mechanical abuse or to heavy accumulations of foreign material on the side in contact with the water, or in the switching mechanism. Electrical wiring connections to the switch must be in perfect order so that the switch action will be transmitted to the control circuit without interference.

Preventive maintenance should be part of standard operating procedure and actively practiced on water controls so as to reduce mechanical failure to a minimum. The use alone of water controls on boilers is not a guarantee that damage from low water will be prevented. *From The Condenser, published by Mutual Boiler and Machinery Company, Boston, Mass.*

For more facts circle 536 on Reply Card→

time studies prove it!

15 man-hours saved for every 400 lbs. of lubricant you use!

Alemite cuts costs!

all the way from barrel to bearing ...in maintenance...repairs... down-time...

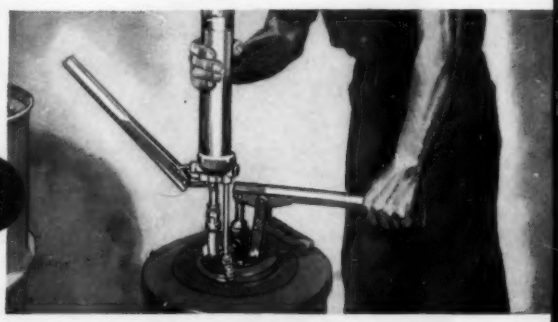
YOU SAVE...STEP BY STEP!

You start with a saving of 15 hours for every 400 pound drum of lubricant used. But that is only the beginning. Far more important is the saving in machine down-time, lubricant and costly bearing replacement. Because this combination of plant proved Alemite equipment insures better lubricated bearings—bearings lubricated only with "refinery fresh," protected lubricant!

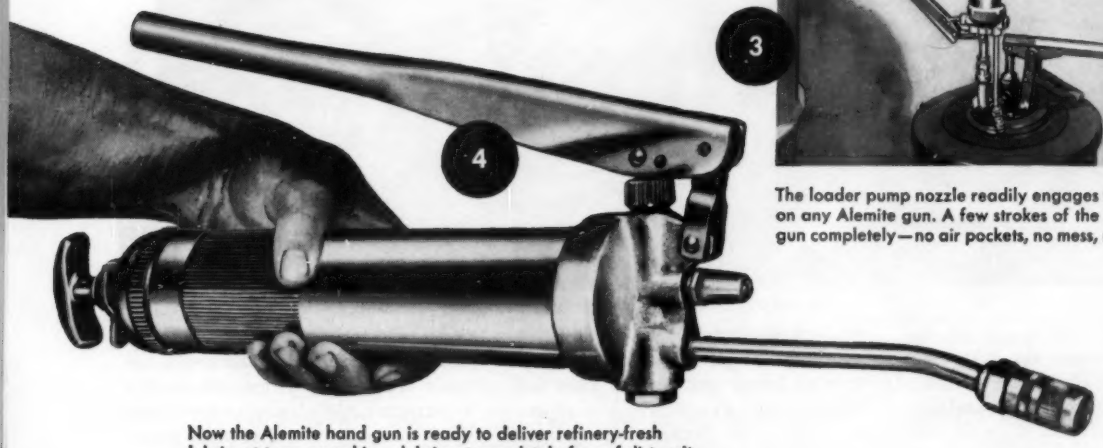
There is an Alemite Hand Gun with the capacity you need—from 8 ounces to 2 pounds. With the pressure you need—up to 15,000 pounds! And there is an Alemite Loader Pump designed to fit any standard size container that you normally use. Stationary models for 100 and 400 pound drums. Portable models for 25 and 35 lb. pails.

A drum of general-purpose lubricant arrives in the oil room. Clean, sealed, fresh from the refinery.

As soon as the drum is opened, an Alemite Loader Pump for hand guns is inserted, completely reseals the drum, protects against contamination.



The loader pump nozzle readily engages the loader fitting on any Alemite gun. A few strokes of the pump fills the gun completely—no air pockets, no mess, no waste!



Now the Alemite hand gun is ready to deliver refinery-fresh lubricant to any machine—lubricant completely free of dirt, grit, or abrasives—protected from barrel to bearing!

With Alemite Plan "A"
Only Refinery Clean Lubricant Reaches Machines

This combination of Loader Pumps and Alemite Hand Guns is known as Alemite Plan "A." It is one of five Alemite plans that your nearest Alemite supplier can show you. Ask him for your copy of the new Alemite booklet, "5 Plans for Better Lubrication." It will help you make lubrication plans that save money in your plant!

FREE! **New Booklet: "5 Plans for Better Lubrication"**

ALEMITE, Dept. T-15, 1850 Diversey Parkway, Chicago 14, Illinois

Please send me my FREE copy of "5 Plans for Better Lubrication."

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Company_____

Address_____

City_____ State_____

ALEMITE

REG. U. S. PAT. OFF.

Ask Anyone in Industry

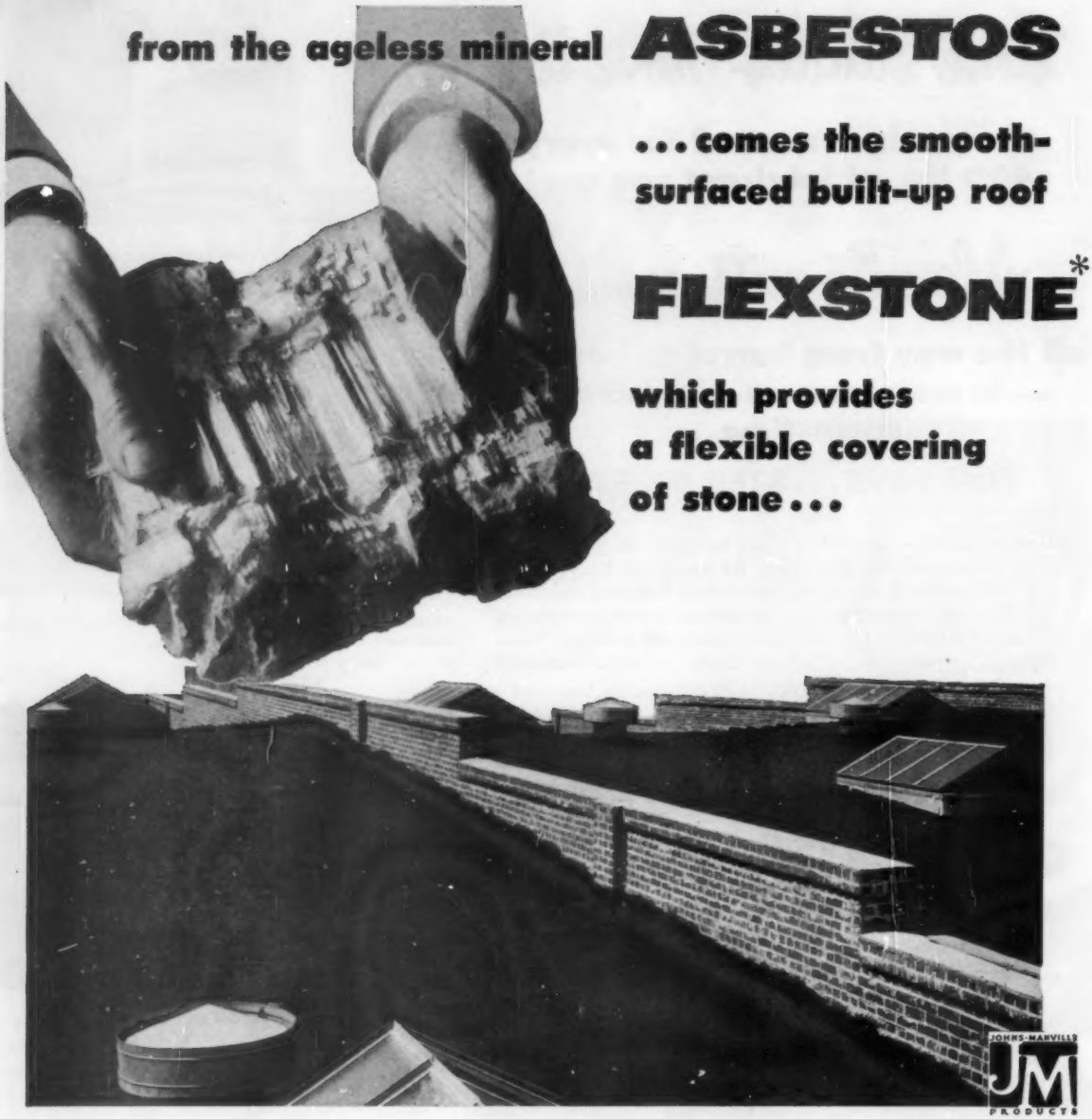
A PRODUCT OF SW STEWART WARNER

from the ageless mineral **ASBESTOS**

...comes the smooth-surfaced built-up roof

FLEXSTONE*

which provides a flexible covering of stone...



Because they are made of the mineral, asbestos, the felts of a Johns-Manville Flexstone Built-Up Roof assure lasting service and protection. They will not support combustion. They effectively resist the drying-out action of the sun . . . won't rot, are weatherproof and need no periodic coating.

J-M Flexstone Built-Up Roofs are smooth-surfaced . . . permit thorough drainage, make any damage easy to locate and repair. They are engineered to each job . . . and can be applied on decks ranging from dead level to a pitch of 6 inches per foot.

For complete information about Flexstone Roofs and J-M Asbestile* Flashing System that provides thorough water tightness and effective treatment for critical roof areas, see your Approved Johns-Manville Contractor. He's listed in the Classified Section of the telephone directory. Or send for folder BU-51A. Write Johns-Manville, Box 158, New York 16, N. Y. In Canada, write 199 Bay St., Toronto 1, Ont.

*Reg. U. S. Pat. Off.

Made of ASBESTOS

Johns-Manville FLEXSTONE* Built-Up Roofs

ASBESTOS CORRUGATED TRANSITE* • ACOUSTICAL CEILINGS • DECORATIVE FLOORS • MOVABLE WALLS • ETC.

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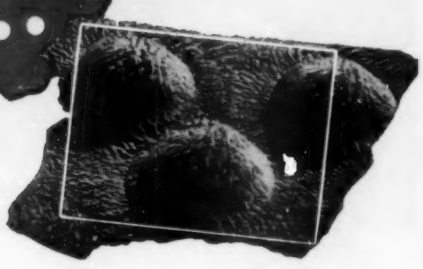
Desert Waste...



Rectangle in small photo shows area of scale sample in large illustration. "Hills" are scale-covered rivet heads. Approximate size of sample: 7" x 5". *Nalco Laboratory photo.*

THIS "desert" was formed under water—improperly treated boiler water. It represents needless waste in several ways... Boiler down time... Overheated drum and rivet metal... Loss of heat transfer efficiency... Sluggish response to load changes.

Since the scale was removed, The Nalco System has kept the boiler clean-to-metal and corrosion-free continuously—and economically. Where conditions require uninterrupted boiler operation, The Nalco System can also be utilized to remove old scale, as well as prevent new deposits. Either way, The Nalco System is your assurance of *permanent water treatment results.* Write for prompt action on your problems.

NATIONAL ALUMINATE CORPORATION
6273 West 66th Place
Chicago 38, Illinois

Canadian inquiries should be addressed to Alchem Limited, Burlington, Ontario

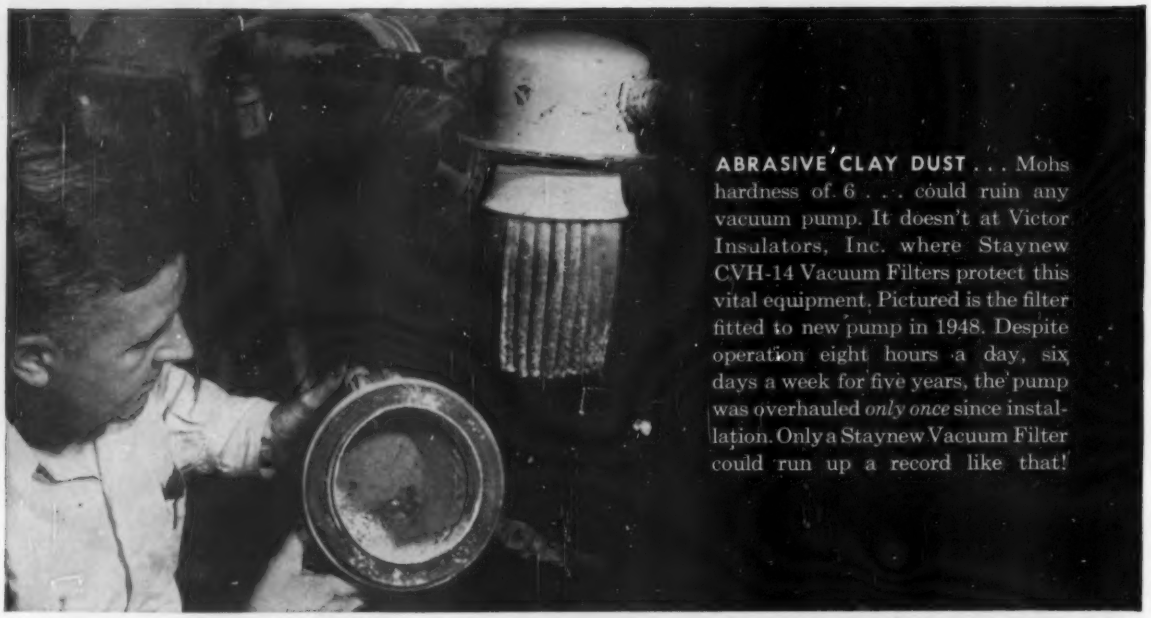
THE Nalco® SYSTEM • **Serving Industry through Practical Applied Science**

For more facts circle 538 on Reply Card

"THIS STAYNEW VACUUM FILTER

CUTS MAINTENANCE TIME IN HALF"

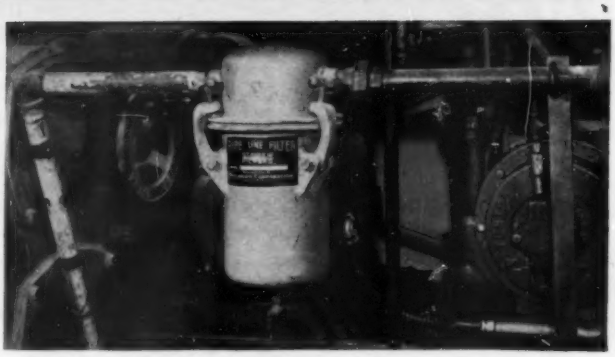
SAYS JIM McKEE
MAINTENANCE DEPT. FOREMAN
VICTOR
INSULATORS, INC.



ABRASIVE CLAY DUST . . . Mohs hardness of 6 . . . could ruin any vacuum pump. It doesn't at Victor Insulators, Inc. where Staynew CVH-14 Vacuum Filters protect this vital equipment. Pictured is the filter fitted to new pump in 1948. Despite operation eight hours a day, six days a week for five years, the pump was overhauled *only once* since installation. Only a Staynew Vacuum Filter could run up a record like that!

This is one of three vacuum pumps on pug mills at Victor Insulators, Inc., drawing air from clay mix. In the process, the pumps draw clay dust back through return air lines. Without the positive protection of Staynew Vacuum Filters, these pumps would be torn down continuously for parts replacement.

You'll want Staynew Filters for your process, too. Send for Staynew Pipe Line Filter Bulletin 200.



DOLLINGER MATCHED FOR STAYNEW FILTERS

Representatives In Principal Cities

DOLLINGER CORPORATION, 55 Centre Park, Rochester 3, N. Y.

ALL TYPES OF FILTERS FOR EVERY INDUSTRIAL NEED

For more facts circle 539 on Reply Card

design with QUALITY felt in mind!

Gaskets, washers, wick lubricators are just a few applications of felt. Felt reduces vibration, controls noise, seals oil in, water out. American makes many types of felt, in rolls, sheets, and in parts cut to your blueprints, ready for assembly. Tell us what you make, or are designing, and we will send technical information along with our suggestions.

American Felt Company
TRADE MARK ®

FREE! Catalog containing 47 samples of felts plus 24-page booklet of Wool Felt Standards. Write for Catalog 185-52.

GENERAL OFFICES: 80 GLENVILLE ROAD, GLENVILLE, CONN.
SALES OFFICES: New York, Boston, Chicago, Detroit, Cleveland, Rochester, Philadelphia, St. Louis, Atlanta, Dallas, San Francisco, Los Angeles, Portland, Seattle, Montreal. PLANTS: Glenville, Conn.; Franklin, Mass.; Newburgh, N. Y.; Detroit, Mich.; Westerly, R. I.
ENGINEERING AND RESEARCH LABORATORIES: Glenville, Conn.

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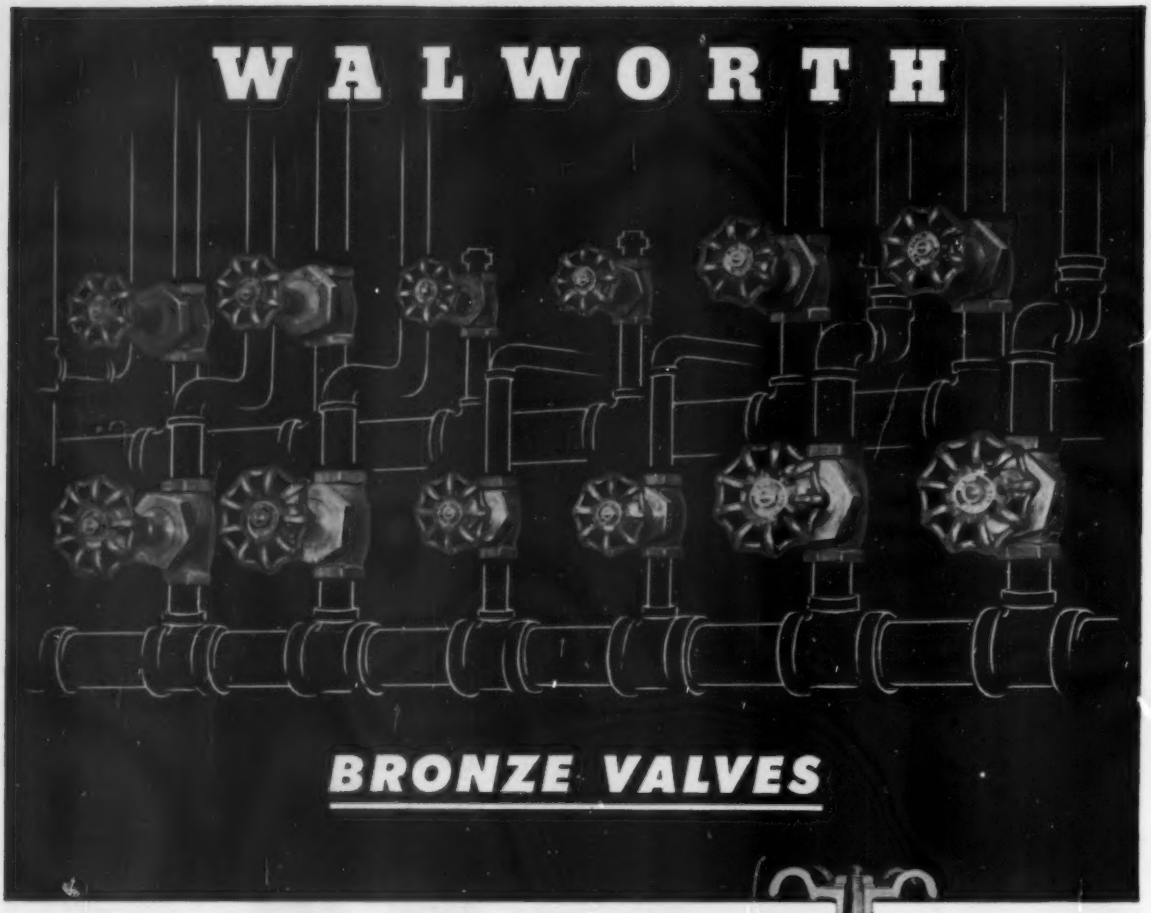
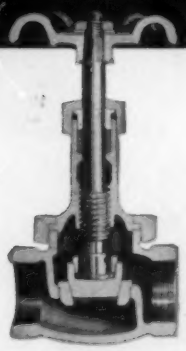
WALWORTH



BRONZE VALVES

Better because ... **Walworth has standardized its line of bronze valves to provide an unsurpassed system of interchangeability of parts for assembly or replacement. You can maintain a great number of Walworth Bronze Valves with a small inventory of basic parts . . . you minimize part replacement problems. For further information, ask us for our Bronze Valve Standardization Chart.**



Parts are carefully machined and finished to close tolerances, thereby assuring accurate fit and alignment under all conditions. Sectioned valve is Walworth No. 225P Bronze Globe Valve with stainless steel plug-type seat and disc, heat-treated to a minimum of 500 Brinell hardness.

Choose from complete lines of Walworth Bronze Valves — including gate, globe, angle, check, and lubricated plug types. Walseal® Bronze Valves and Fittings are also available for making silver-brazed joints.

For full information on Walworth Bronze Valves and Fittings, call your Walworth Distributor, nearest Walworth Sales Office, or write to Walworth Company, General Offices, 60 East 42nd Street, New York 17, N. Y.

WALWORTH

Manufacturers since 1842

valves . . . pipe fittings . . . pipe wrenches

60 East 42nd Street, New York 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

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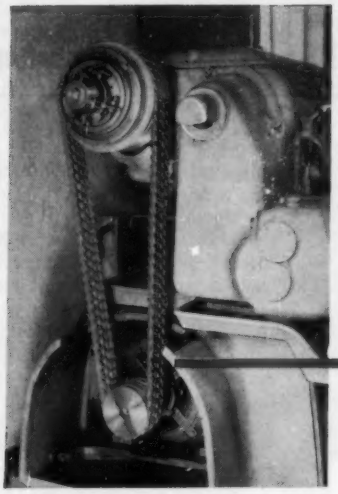


Performance Proves

20% to 90%

LESS VIBRATION

with Veelos—the Balanced V-belt

Engineers have long known that there are four principal causes of machine vibration: 1. bearings; 2. motor; 3. clutch; 4. sheaves. Often overlooked is a fifth cause: v-belts. And, in many instances, *v-belts alone* are the major cause of vibration.

There's a logical reason for this.

Regular v-belts have spots of varying density due to their construction. Normally, these spots are not apparent, yet they throw the belt out of balance when the drive is operating. As a result, vibration is created that can damage bearings, shafts and, most important, the finished work.

This is not true of Veelos v-belts.

Veelos is absolutely uniform throughout its entire length. Every link and every stud is identical. The smooth, machine-cut sides and the laminated construction assure smooth, vibrationless power delivery. Veelos is perfectly balanced.

In case after case, installation of Veelos v-belts has reduced machine vibration 20% to 90%.

Proof that Veelos will reduce vibration can easily be demonstrated with an electronic vibration analyser. This analyser measures amplitude of vibration to as low as 2-millionths of an inch.

Fifteen minutes of your time is all that is required to show you with the electronic analyser that Veelos creates less machine vibration. Drop us a line or clip the coupon for a demonstration.

VEELOS
THE LINK
V-BELT

Manheim Manufacturing & Belting Company
652 Manbel St., Manheim, Pa.

Yes, I would like a demonstration. **Have your representative call me for a convenient time.**

Name .....

Company .....

Address .....

.....

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Veelos is known as Veelink outside the United States.

2CV

For more facts circle 542 on Reply Card

OPERATION AND PRODUCTION pointers for the industrial plant engineer

Edited by H. E. B. Anderson

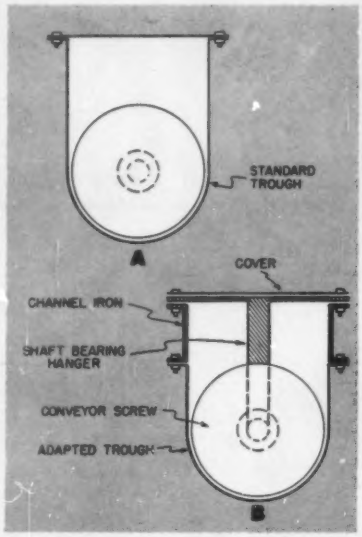
Conveyor Trough Design Simplifies Maintenance

Contributed by H. J. Boyenga

LIGHT-WEIGHT CHANNEL IRON used in the construction of troughs for screw type conveyors provides many advantages in maintenance and down-time reduction. Because the bottom of the trough wears out first, replacing only this portion without disturbing the screw, bearings or supports is ordinarily the most often required repair. This is particularly true where the handling of coal, ashes and other abrasive materials causes rapid deterioration of the trough bottom.

On most conveyors of this type, replacing the trough necessitates disassembly of the entire unit, loosening all bearing hangers and temporarily shoring or supporting the screw.

Using channel iron construction, only the damaged bottom portion of the trough is disturbed and replaced. Much less work is required, and the cost of material used is less than half that of replacing whole trough.



Cross sections of standard and adapted conveyors illustrate channel iron inserts

Over long spans, the channel iron components offer a bonus in increased rigidity of construction. Hanging requirements are less complicated; bearing wear and trough wear due to misalignment from damage or unsteady conveyor supports is minimized.

Replacing the standard design trough, made of a single piece of formed sheet metal, the suggested construction uses channels for the upper parallel trough sides. The curved bottom portion of the trough is formed to be fastened to the bottom leg of the channels without altering any of the original inside dimensions. In this way, the part most susceptible to wear is constructed of appreciably less material and is readily replaceable when worn through.

"Remote" Watchman

Contributed by H. T. Bailey
Brillion Iron Works

WATCHMAN SERVICE without the watchman has been provided for a steel storage shed on our plant property. Its location, about a quarter mile from the main plant and the guard house, posed the problem of

(Continued on page 52)

Sloped Trench Accelerates Flow of Coolant in Underfloor Network

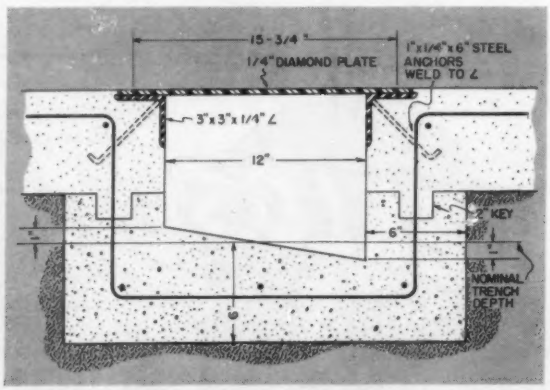
Contributed by Howard K. Fitting
Standard Pressed Steel Co.

INTENDED TO INSURE a continuous supply of fresh coolant for its battery of 56 centerless grinding machines, Standard Pressed Steel has installed an underground, completely automatic coolant system.

An important part of the system, which handles 500 gpm, is the network of floor channels or trenches that receive dirty coolant oil from the battery of grinders and carry it to a dirty oil sump.

The bottom of the trench has a two-inch slope across its 12-in. width, which encourages coolant sludge to gravitate toward the low side of the trench bottom. Here, the coolant is more easily swept downstream toward the sump. Even when the volume of coolant is low, concentration of the coolant in the low side of the trench provides sufficient flow rate to keep the sludge moving.

Depth of the trenches increases from six inches at the beginning of the network to 2 ft where the trench enters the sump.



Lifting floor plates exposes layout of trenches carrying coolant. Construction of sloped trench shown in drawing at right

For more facts circle 543 on Reply Card

Right off your Square D Distributor's shelf!

New QMB Saflex Distribution Panelboard

Exactly the Power Panelboard you want—when you want it. Your Square D Distributor stocks boxes, interiors and plug-in units which can be quickly assembled to meet virtually any specifications. Above, interior ready for easy mounting in box.

Plug-in Units are installed easily on tubular bus bars. The solid neutral can be changed in minutes. Here is flexibility that reduces "down time" and saves money.

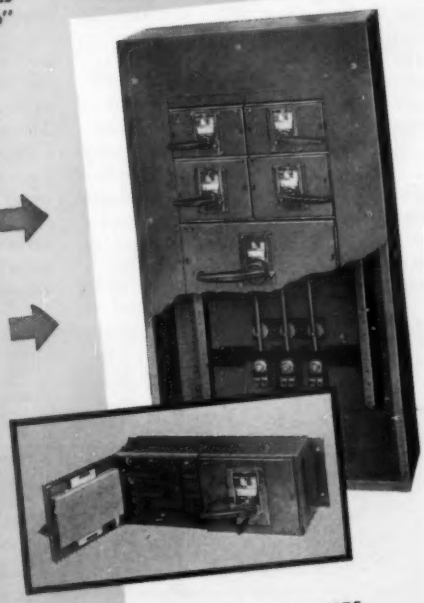
Three Simple Assembly Steps Fronts, with adjustable trim clamps, are available with or without doors.

With ALL these Quality Features

INTERIORS are flexible and adaptable to almost any service and voltage. Plug-in units and solid neutral can be changed simply and quickly.

BOXES provide generous wiring space.
FRONTS furnished with or without doors have adjustable trim clamps.

UNITS have quick-make, quick-break switch mechanism, visible blades and are horsepower rated. 30, 60, 100 and 200 ampere units are plug-in, while 400 and 600 ampere units are bolted to the bus.



•*Underwriters' Approved for Service Entrance*

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY

OPERATION—PRODUCTION

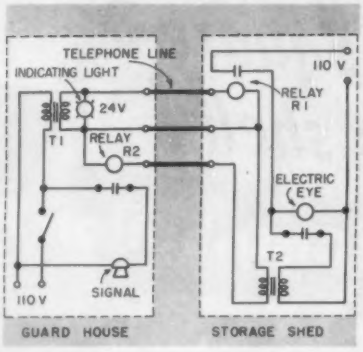
(O and P begins on page 50)

protection, particularly at night. An electric eye has proved an ideal "watchman" for the building.

The system employs a standard photo-electric receiver and a light source equipped with an infra-red filter to eliminate the usually visible light beam.

Main control, consisting of an on-off switch with indicating light and a warning horn, is located in the plant guard house. An overhead three-wire telephone line connects this control station with the remote electric eye circuit.

With the main switch on, stepdown transformer T_1 is energized, and sends a 24 v signal through the telephone line. This signal energizes relay R_1 at the remote location, activating the electric eye and light source.



Schematic wiring diagram of electric eye circuit used in remote protection

Interruption of the light beam will drop out the relay of the receiver, energize transformer T_2 and send a 24 v signal back to the guard house. Here, the signal will actuate relay R_2 and sound the alarm bell. The third wire of the telephone circuit is used as "common" for both transformers.

Refinery Heater Increases Yield

BURNING NON-CONDENSABLE GAS from the refinery, a newly developed hot oil heater reheats crude from 630 to 780 F for reprocessing, and enables the Oriental Refining Co., Denver, to realize additional salable product yield worth approximately $100.00 per day.

Fifteen gallons per minute of reduced crude are drawn off the bottom of the crude fractionating tower at 630 F; this oil is pumped into the coils of the hot oil heater, which was designed and built by Vapor Heating Corp., Chicago. As the material goes through the coils, hot gases in the heater raise the temperature about 150 degrees. This reheated crude is pumped back into the distillation unit,

(Continued on page 54)

Mercury Switch Combinations Assure Safety in Boiler Operation

Contributed by G. F. Suchy

FOUR BOILERS in our old boiler room are served by a single steam engine which drives both the forced draft fan and the line shaft which operates the four stokers. As a safety measure, it was decided to install an electric switch on each boiler, with a motorized valve on the engine to stop it in case of low water in any one boiler.

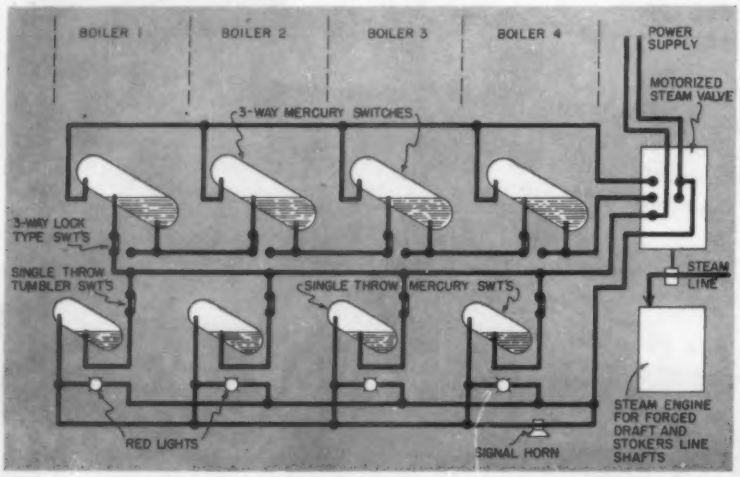
Four float switches, each containing a 3-way mercury switch and one single-throw mercury switch, were installed in addition to the motorized steam valve. The steam valve has two cam-operated switches, one maintaining the circuit while the motor opens the valve (the circuit being completed through one or more of the mercury switches on the boiler). As the valve comes to a wide open position, the first cam switch opens and the other cam switch closes, ready for closing the valve when energy is furnished again through one or more of the 3-way mercury switches.

When any boiler is drained for inspection or cleaning, the 3-way switch on it must be neutralized while the others remain in operation. This is accomplished by using 3-way tumbler switches of the locking type. This type prevents inadvertent neutralizing of the switches, rendering their safety function useless.

In any combination of conditions where one or more float switches are neutral while one is in normal position and one may be on low water position, the entire system is constantly "on guard" to stop the stoker-blower drive engine if low water occurs.

In addition to the 3-way mercury switches, each float operates a single-throw mercury switch, connected to a red light mounted on the front of each boiler, to indicate which boiler has low water. A signal horn in the boiler room is turned on by any one of the units when low water occurs. The red light and the horn continue signaling until proper water level is restored, or the single-throw float switch causing the contact is neutralized, through a single pole tumbler switch. The extra single pole tumblers are required because the cam switches in the motorized valve exchange circuits at the end of each 180 deg cycle. Thus, if the signal circuits were integral with the 3-way mercury switches, the signals would cease to give alarm when the motorized valve completed its closing cycle.

Also, when a boiler is to be drained, the single-throw switches can be used to cut out the signal light circuit, without affecting the horn circuit and the circuits of the other units. The signal horn remains operational with any one of the undrained boilers.



Schematic diagram of mercury switch circuit connected for steam valve control

Otis FREIGHT ELEVATORS

HEAVY DUTY · GENERAL DUTY · LIGHT DUTY

EASILY INSTALLED FOR LIGHT FREIGHT

OTIS LIGHT DUTY ELECTRIC FREIGHT ELEVATORS ARE SELF-SUPPORTING UNITS

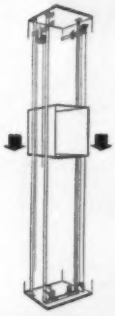
You can have electric power freight handling at relatively low cost.

Otis Self-Supporting Elevators have been designed specifically for hoisting light freight between 2 or 3 floors. They are made in 3 standard sizes with lifting capacities of 1,500, 2,000 or 2,500 lbs. They travel at 25 feet a minute and are suitable for all rises up to 35′-0″.

Otis light duty elevators are self-supporting units. They keep all heavy loads off the building structure. They can be installed for freight handling in any store, laundry, hospital, storage building, or manufacturing plant quickly and inexpensively.

NO COSTLY ... building reinforcing

The guide rail structure carries the hoist ropes and sheaves, the elevator car, and the full freight load. Its vertical T-rails and cross channels transfer heavy vertical loads to the bottom of the pit.



The guide rail structure is attached to the building at each floor and at the top of the hoistway to steady the structure and take light horizontal thrusts.

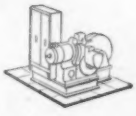
NO COSTLY... penthouse

The supporting structure stops at the underside of the roof. Horizontally folding car gates reduce the hoistway headroom requirements above the top landing to 10′-6″. Where extra headroom permits, standard vertical steel gates may be used to leave the full door width clear for loading.

This headroom permits the use of steel vertical bi-parting hoistway doors. They are constructed for long life under the rough handling encountered in freight service.

NO COSTLY ... overhead supports

The hoisting machine is mounted as a complete unit on a concrete foundation at the bottom floor. It is powered by an Otis-built electric motor and operated by an Otis-built controller. The overhead hoist rope sheave is supported by the elevator structure.



* * *

There's no need to delay a change to electric power freight handling. Write for Booklet B-720 or ask any of our 268 offices about Otis Self-Supporting Freight Elevators.

Otis

Otis Elevator Company
260 11th Ave., New York 1, N. Y.

For more facts circle 544 on Reply Card

IS DOWNTIME UPPING YOUR COSTS?

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MANZEL
FORCE FEED LUBRICATION

Pressure Application—Exact Amounts—Accurately Timed

Because they operate automatically—dependably lubricating vital parts without thought or attention whenever machinery is running—Manzel Force Feed Lubricators eliminate costly shut downs for hand oiling and for repairs necessitated by faulty or neglected lubrication. They save labor and lubricants, too.

To keep costs down and production up, keep machines running with Manzel Force Feed Lubricators. They can be installed on machinery you are now using or incorporated into new equipment. For information write:

Manzel

DIVISION OF FRONTIER INDUSTRIES, Inc.
301 BABCOCK STREET, BUFFALO 10, NEW YORK

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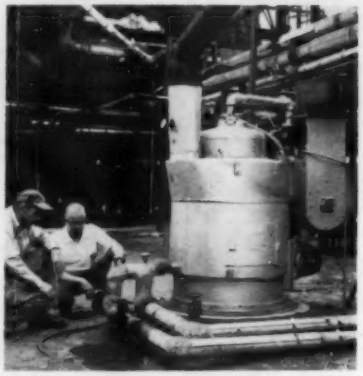
OPERATION — PRODUCTION

(O and P begins on page 50)



Oil heater located in refinery area burns waste gas to heat oil in process

with a resultant increase in output from 60 to 70 barrels per hour.

The fuel, which comes from one of the refinery's thermal cracking units, has a 1500 Btu content. It is piped to the burner at 3 to 6 oz. pressure. At the present flow rate, 15 gpm, the heater is transferring about 760,000 Btu per hour to the crude. Efficiency of the heater is indicated by the fact that the stack temperatures run about 100 degress above the oil temperatures.

Welding Tips for Die Castings

SUPPLEMENTING their extruded white metal welding rod, Oxweld 49, Linde Air Products Co. offers advice to potential users of the rod for welding die castings.

Safety-wise, adequate ventilation is a must, to prevent the operator's exposure to fumes, and protection should be provided for the operator's face, arms and hands, to deflect any small bits of white metal that may fly off.

Preparation for welding is a five step procedure: 1) grind or file the area along both sides of the break to clean it, working out at least 3/16 in. on each side, and clean the rod with a vixen file; 2) support the casting with bricks, carbon (paste, rod or plate) or wet asbestos; 3) make a spatula from steel or bronze welding rod; 4) connect a small welding head or tip to the blowpipe; 5) select 3/16-in. rod for ordinary work, and ⅛-in. rod for small, thin-wall castings.

Weld with a slightly excess acetylene flame. Preheat the entire casting with outer envelope of flame, occasionally holding the flame over the break for a few seconds. (Never bring the blowpipe tip closer than 3 in. from

World's Strongest Tape?

Thousands of filaments imbedded in the pressure-sensitive adhesive of "Scotch" Brand Filament Tape make it *super-strong* and shock-resistant for heavy-duty packaging and materials-handling. Furthermore, the exclusive "mirror surface" adhesive of this newly improved tape gives 100% tape contact; puts all the amazing strength of the tape to work. For complete information, just write on your letterhead to Dept. PE-15.

FILAMENT TAPE . . . one of 300 PRESSURE-SENSITIVE TAPES for industry, trademarked . . .

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SCOTCH BRAND

The term "Scotch" and the plaid design are registered trademarks of Minnesota Mining and Manufacturing Co., St. Paul 6, Minnesota. General Export: 122 E. 42nd St., New York 17, N. Y. In Canada: London, Ontario, Canada.

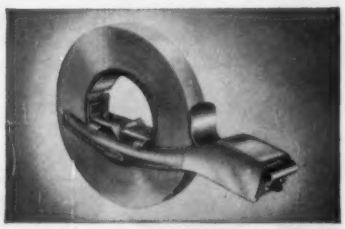
3M COMPANY

LOOK what you can do with it!

SAFER SHIPPING when you secure loads against shifting with "Scotch" Brand Filament Tape. Easy to apply; easy to remove at destination. Tests have proved that goods come through 99% "Safe Shipments"!

SECURE ODD-SHAPED PARTS quickly and easily with a few quick wraps of "Scotch" Brand Filament Tape with the new "mirror surface" adhesive. Won't scratch soft metals; parts can't slip loose. Tape comes in red, white, black, and transparent.

CUT BUNDLING COSTS, get better results with "Scotch" Brand Filament Tape. Makes substantial savings in labor costs; cuts freight costs; does not mar finished pieces.



APPLICATION IS QUICK, EASY with this new hand dispenser designed specially for "Scotch" Brand Filament Tape. Heavy-duty construction; rustproof. Improved blade quickly cuts tape up to 1-inch wide.

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You needn't be a gear engineer to use this new Reducer Catalog...

• BRAD FOOTE'S new Speed Reducer Catalog is easy to use. It contains simple instructions on how to choose and how to order. It tells you what job factors to consider and the reasons why. It eliminates the "mysteries" of speed reducer selection.

• Horsepower rating tables* and dimension charts are printed in large easy-to-read type. Pages are uncrowded and easy on the eyes. Every figure and every dimension can be located quickly. Complete index speeds finding the data you need. So do the index markers at the top of each page.

• In the new No. 120 Speed Reducer Catalog, BRAD FOOTE helps you choose the reducer you need from single, double or triple reduction parallel shaft, and double and triple reduction right angle types. It's as easy as A, B, C.

Write today for your free copy

*Conform to AGMA standards

BRAD FOOTE GEAR WORKS, INC.

1309 South Cicero Avenue • Cicero 50, Illinois
Bishop 2-1070 • OLympic 2-7700 • TWX: CIC-2856-U

subsidiaries

AMERICAN GEAR & MFG. CO.
Phone: Lemont 920
Lemont, Illinois

PITTSBURGH GEAR COMPANY
Phone: SPaulding 1-4600
Pittsburgh 25, Pennsylvania

For more facts circle 547 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 50)

casting.) Continue to apply preheat during welding. Apply rod when fine beads or droplets appear on surface of break. If oxides are still present, break them down with the rod or spatula before welding. Scrape away impurities with the spatula.

Stir or puddle the molten metal with the rod, to get complete penetration, and build the weld ⅛ in. higher than the original surface. Do not quench to cool—allow the casting to cool slowly. Following the same procedure, the other side of the casting can be welded for additional strength.

For extremely thin sections, carefully preheat the casting, then deposit a small amount of rod next to the break. Heat the spatula about 1 in. from its end, then touch hot spatula to deposit and simultaneously to sides of the break. If necessary, re-apply flame to spatula while in the puddle.

Small Hoist, Big Load

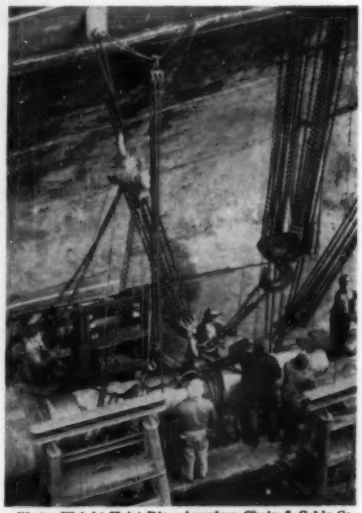

Photo: Wright Hoist Div., American Chain & Cable Co.
Shipyard riggers lift propeller shaft with new 25-ton Wright chain hoist (left). Older hoists (right) of similar capacity are heavier and cumbersome

Cable Keeps Sand Hot

ELECTRIC HEAT keeps foundry molding sand from freezing and caking during winter-time off hours, in an unheated building at the Lackawanna Foundry Co., Lackawanna, N. Y. Thermwire electric heating cable is laid over the sand pile at the end of each day, to keep the sand just above

Neoprene soles stand up to chemicals, oil, heat ...stand out in long wear and comfort

WORK SHOES made with neoprene soles and heels may look like any other work shoes —but what a difference resilient neoprene makes in service and comfort!

Take the sturdy chemical safety shoes pictured above. Their rugged neoprene soles and heels withstand attack by chemicals, solvents, oil and grease. Scuffing over rough surfaces won't cause them to chip or crack. Hot factory flooring produces no softening or loss of shape. Neoprene soles *stay* firm and trim . . . *stay* on the job where other resilient materials fail. Yet tough as they are, they have a flexibility and springiness that brings comfort to every step.

Frequently, neoprene soles actually outlast the shoe uppers in roughest service! That's cost-saving performance—the kind you can expect from the wide variety of neoprene products now serving industry. Although Du Pont makes no finished products of neoprene, your rubber goods supplier will gladly tell you about the neoprene products he sells.

SPECIFY NEOPRENE IN THESE PRODUCTS:

MAIL THIS COUPON TODAY

NEOPRENE

The Rubber Made by Du Pont Since 1932

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BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

FREE! THE NEOPRENE NOTEBOOK—Every issue describes new products, unusual applications of neoprene . . . shows how neoprene cuts maintenance costs. Clip and mail this coupon to get on the mailing list. E. I. du Pont de Nemours & Co. (Inc.), Rubber Chemicals Division PL-1, Wilmington 98, Del.

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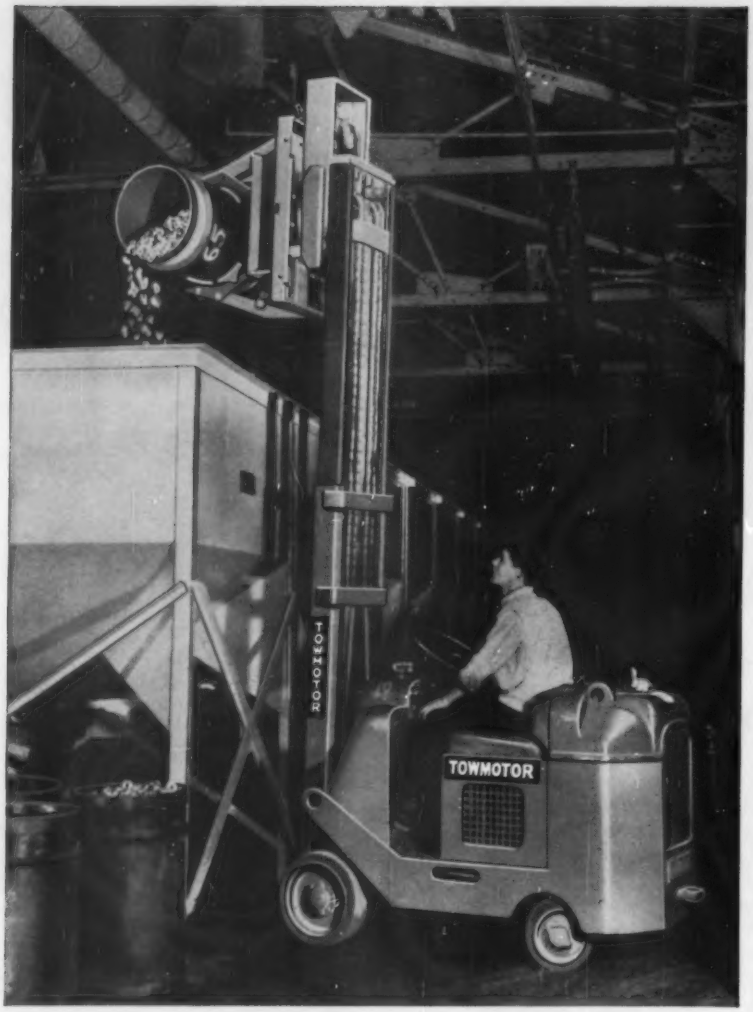
For more facts circle 548 on Reply Card

TOWMOTOR
THE ONE-MAN-GANG ®

FORK LIFT TRUCKS

at Columbia Malleable Castings Corporation



300% PRODUCTION INCREASE

. . . Overall Handling Costs Cut 60%

Job-Planned Towmotors now pour finished parts into hoppers using a Revolving Barrel Grab. Parts feed down to a weighing conveyor and are bagged mechanically for shipment. Manual filling was eliminated and output per man increased 300%. Overall, Towmotor cut handling costs 60%.

Towmotor equipment does wonders in every plant where handling is a problem. For more information write for Job Studies covering your industry, your competition. TOWMOTOR CORPORATION, Div. 5801, 1226 East 152nd Street, Cleveland 10, Ohio.

***FOR FAST ACTION**—See a Material Handling Specialist—your nearby Towmotor Representative. His factory training will show you the quickest way to attain maximum handling efficiency at minimum cost.*

For more facts circle 549 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 50)

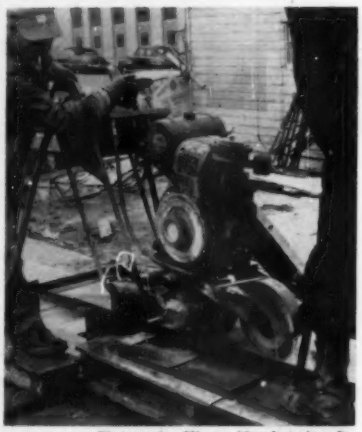
Photograph: Edwin L. Wiegand Co.

Foundry bench molder lays coil of electric heating cable over sand pile

the freezing point until work resumes the next day.

Each benchmolder has one coil of heating cable, 80 ft long, rated at 400 watts, to cover the sand at his work station, avoiding overnight freezing.

Concrete Saw Runs on Tracks



Photograph: Clipper Manufacturing Co.

Angle iron "track" built to guide Clipper concrete saw proved answer to problem of sawing 12-in. squares of sandstone for paving job. Sharp Brothers Contracting Co., Kansas City, Mo., designed and built the special frame

Tight Spot Strobotac

FACED WITH NEED to get a stroboscopic light into a confined space, R. T. Riall of the Norfolk Naval Shipyard devised a handy extension.

Requiring only a ¼ v, 100 w neon lamp and socket, a phone plug to fit into the Strobolux jack on the Strobotac, and a small 20:1 transformer,

Alert Manufacture and Distribution Require Power . . . FLUID POWER

Where industry enjoys significant improvement in production and lowered costs, you find more and more use of FLUID POWER . . . Machine Tools performing multiple operations faster and with greater precision . . . Presses forming a wider variety of pieces in larger quantities . . . Mobile Equipment moving work-in-process or finished units "from where they are to where you want 'em" quickly, safely, economically.

Three divisions of The New York Air Brake Company concentrate their facilities on the development of advanced design hydraulic equipment . . . Gear, Dual-Vane and Piston Pumps . . . Gear and Dual-Vane Motors . . . Single, Double-Acting and Telescopic Cylinders . . . Control and Auxiliary Valves. Thus, industry may select from a full range of types, capacities and pressures the components to develop complete hydraulic circuits which ideally suit the specific requirement . . . all from a single source.

Hydraulics engineers naturally turn to The New York Air Brake Company for answers to their problems. Whether the service be for rugged duty on Mine, Construction, Farm, Oil Field, Marine and Materials Handling Equipment, or for the automation of high production, micrometrically precise Machine Tools, Paper, Textile, Petro-Chemical and other processing equipment, the products of Air Brake are the obvious choice.

Industry also finds the answers to liquid handling problems in Aurora and Kinney Pumps. "Any material that can be pushed through a pipe" . . . from gasoline, alcohol and other volatile liquids to tars, sludges, slurries and semi-solids, the right pump in the right size is available. And, for vacuum processing of every sort, Kinney High Vacuum Pumps provide outstanding advantages in performance and production costs.

DUDCO DIVISION
Hazel Park, Mich.
Dual-Vane Hydraulic Pumps, 3 to 120 gpm; Fluid Motors, 7 to 140 hp; 2000 psi operation. Piston-Type Pumps for 5000 psi.

HYDRECO DIVISION
Cleveland, Ohio
Gear-Type Hydraulic Pumps, 3 to 120 gpm; Fluid Motors, 3 to 52 hp; Cylinders; Control and Auxiliary Valves; 1500 psi.

WATERTOWN DIVISION
Watertown, N. Y.
Railroad air brake valves for freight and passenger equipment, STRATOPOWER Hydraulic Pumps for Aircraft, to 3000 psi.

KINNEY MANUFACTURING DIVISION
Boston, Mass.
Rotating Plunger and Heliquad Liquid Handling Pumps, to 3000 gpm. Vacuum Pumps, 0.2 micron, evacuate 1800 cfm.

AURORA PUMP DIVISION
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Liquid Handling Pumps, Centrifugals and deep well Turbines, 7000 gpm, 500 ft. heads. Turbine-type, 150 gpm, 600 ft. heads. Condensate Return Units.

Write for descriptive literature and engineering information to help you improve your product, speed production and lower costs.

THE NEW YORK AIR BRAKE COMPANY

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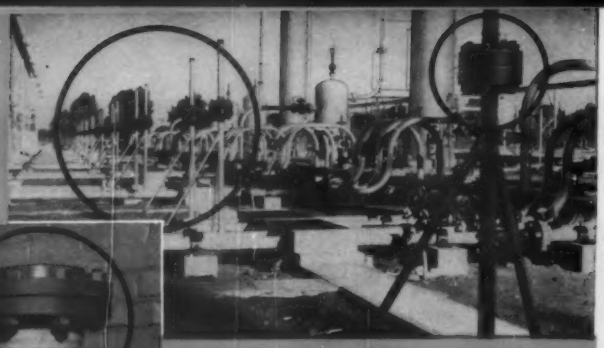
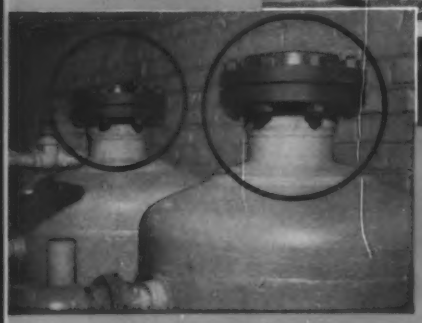
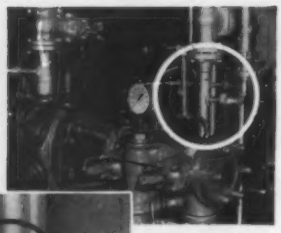


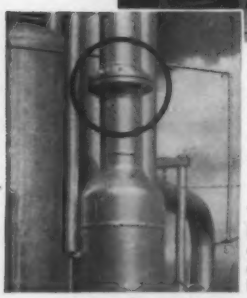
BS&B Safety Heads protect compressor lines at a South Texas condensate recovery—pressure maintenance plant.



Equipment and personnel within a plant are protected from the hazards of overpressure in these vessels by BS&B Safety Heads.

BS&B Safety Heads Have Hundreds of Applications!



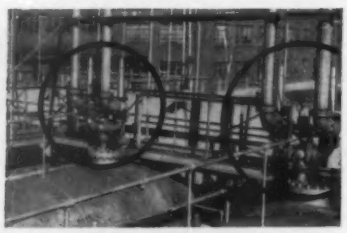


Here a BS&B Union Type Safety Head, with Monel rupture disc, is installed on a two-stage hydrogen compressor.

This BS&B Safety Head is mounted on the flare from a Pop Valve on an incoming gas line.

The variety of possible uses for BS&B Safety Heads is limited only by the number of different ways in which compressed air, gas or liquids—either bland or corrosive—are handled, processed or stored by our many manufacturing and processing industries! Wherever protection of a closed pressure system is required, there is a correct size and type of BS&B Safety Head to do the job! For detailed information, ask your BS&B Representative . . . or write to us direct.

THE "CIRCUIT-BREAKER" OF *Any Pressured System*



BS&B Combination Safety Head—Relief Valves protect 15,000 gallon butadiene storage tanks at an Akron, Ohio, rubber plant.

BLACK SIVALLS & BRYSON, INC.

Safety Head Division, Dept 2-P1
7500 East 12th St., Kansas City 26, Mo.

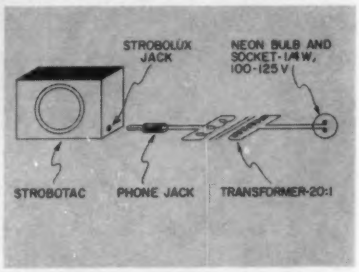
EFFICIENCY OVER 60 YEARS BS&B RELIABILITY

OPERATION—PRODUCTION

(O and P begins on page 50)

the unit is a worthwhile Strobotac accessory.

The transformer is required in the circuit between the Strobotac and the neon light because the output at the



Wiring diagram of Strobotac extension

Strobolux jack on high scale is too small to fire the neon light.

With leads of sufficient length, the light can be inserted into many spots where the main unit will not fit.

Ramp Eases Chip Dumping

Contributed by Walter Seib
Allis-Chalmers Manufacturing Co.

ONE PHASE OF CHIP HANDLING in the shop requires that wheelbarrow loads of chips be dumped into three-sided metal boxes. These boxes, when filled, are picked up by an overhead crane for dumping at a central point for disposal.

Channel iron bracing on the bottom of the chip boxes raises the entry lip of the box off the floor, and getting the wheelbarrow wheel into the box to dump in the rear was difficult and often unsafe.

A beveled entry "lip" formed from

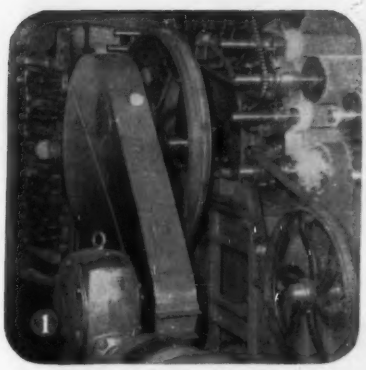
Suggestor Seib points out fabricated metal ramp, welded into place on box

sheet metal is now welded to the front of the chip box, providing a sloping ramp into the box and facilitating the dumping of loads of chips.

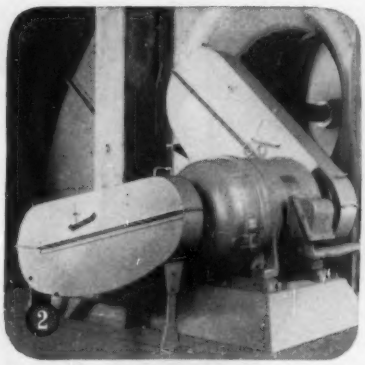
← For more facts circle 551 on Reply Card

If you need a drive for jobs like these--

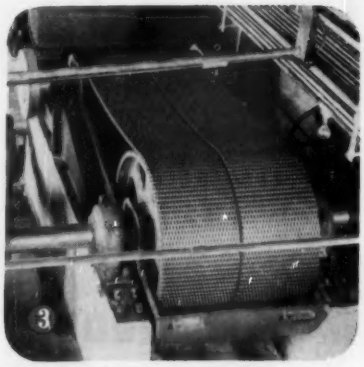
YOU'RE MONEY AHEAD
with LINK-BELT Silent Chain



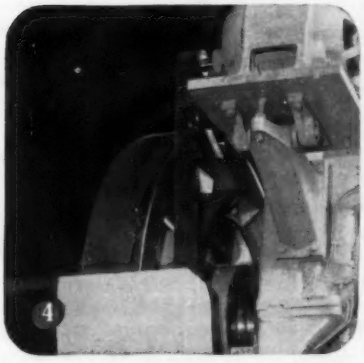
1 ADVERSE OPERATING CONDITIONS. Humidity, heat, cold do not lower Link-Belt Silent Chain's better-than-98% efficiency.



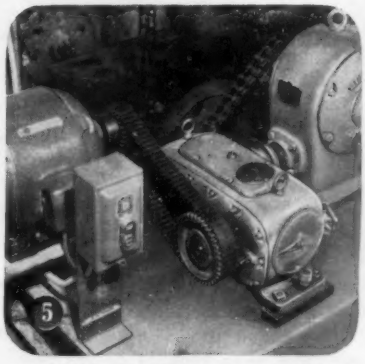
2 UNFAILING SAFETY. Dependability assures continued production. On above tunnel ventilators, Link-Belt drives protect human life.



3 LARGE OR SMALL HP. A versatile line, Link-Belt Silent Chain drives are available from fractional to thousands of horsepower.



4 LARGE RATIOS. Link-Belt Silent Chain operates efficiently on extremely short centers at ratios as high as 10-to-1.



5 LIMITED SPACE. Easy to assemble in close quarters, Link-Belt Silent Chain permits built-in drives, compact housings.

6 HIGH SPEED. After 13 years on this newspaper press at speeds up to 4700 fpm, Silent Chain is still efficient.

Here's why Link-Belt Silent Chain Drives offer you more per dollar spent:

- Lower cost—often lower in first cost, always lower in ultimate cost.
- Longer life—trouble-free performance for 25 or 30 years is common.
- No dismantling machine or removing sheaves for repairs.
- Better than 98% efficiency.
- Maintained ratio assures full productive capacity.
- Slipless action assures a better product.
- Easy to install.
- Safe to employees—operates in oil-retaining casing.

For all the facts, see your Link-Belt distributor or factory branch store, or write for new Book 2425.

13,448

LINK-BELT

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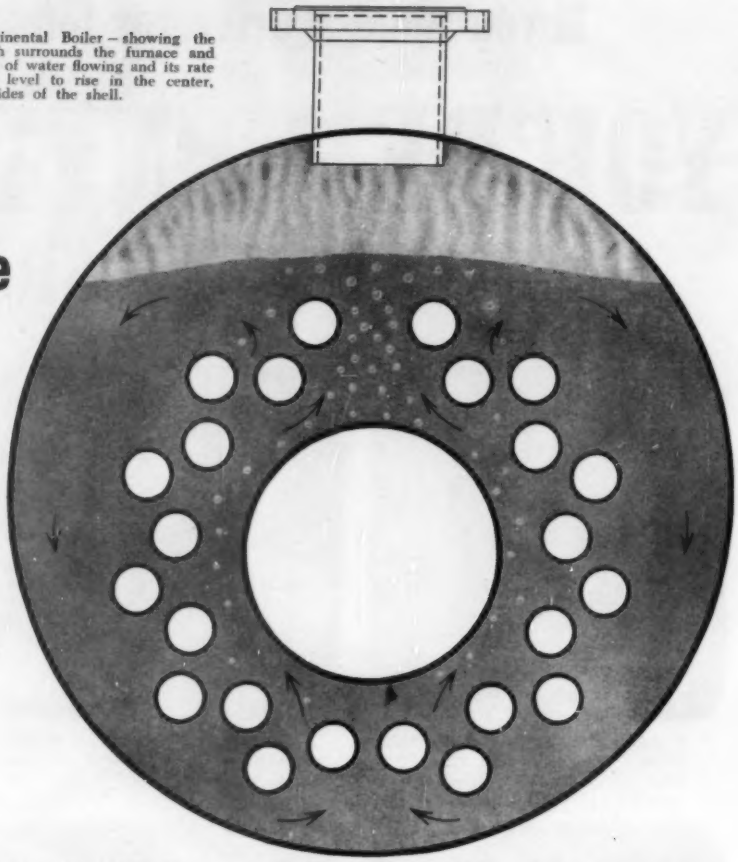
Cross-section of a Continental Boiler – showing the free flow of water which surrounds the furnace and return tubes. The volume of water flowing and its rate of flow cause the water level to rise in the center, then fall away to both sides of the shell.



What makes the Continental Boiler last longer... makes steam cost less

If you were to design a packaged boiler, water circulation would be a basic consideration because . . .

. . . poor circulation can cause overheating . . . can cause unequal stress in metal heating surfaces . . . can promote pitting and scaling on metal surfaces exposed to water . . . and can result in higher stack temperatures, decreased boiler efficiency.

But the many owners of Continental Boilers have had none of these troubles. Here are two special reasons why:

1. Two-pass design provides even flow of combustion gases to all heating surfaces.

Heat is thus distributed evenly to the rear tube-sheet and to all of the return tubes. Water is heated uniformly, and natural, balanced circulation results.

If high temperature combustion gases were to enter only one section of the return tube bank, the tubes in that section would be at a higher temperature, would be doing more work than the balance of the tube-sheet and return tubes. The result: water surrounding those cooler heating surfaces would have sluggish circulation.

2. Heating surfaces in the Continental Boiler are arranged so that there is a centrally located furnace and equal spacing of return tubes.

Of the total heat transferred to the water within a Continental Boiler, about 60% is transferred by the furnace. Thus it is essential that flow of water around the furnace be unrestricted. Note the area around and above the furnace and the open channel along both sides of the boiler shell. This design assures unrestricted flow of water around the furnace . . . facilitates rapid flow of water to the bottom of the boiler for reheating.

Uniform . . . free . . . rapid water circulation is an important reason why a Continental Boiler costs little to keep, has long service life, and makes steam cost less. For detailed information write for Bulletins BE-3, BE-4.

BOILER ENGINEERING & SUPPLY COMPANY, INC.

Phoenixville, Pa.

CONTINENTAL . . .
the boiler with the spinning gas technique

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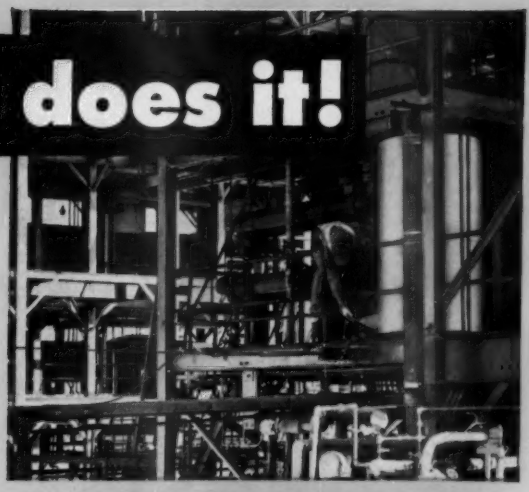
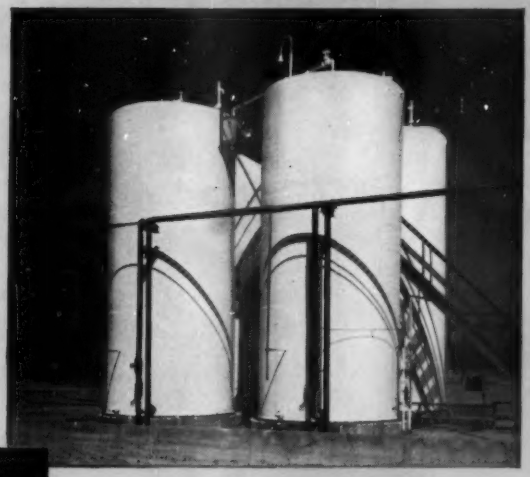
EPON® RESIN does it!

New paint lasts years ...resists corrosive spillage at Diamond Alkali plant





HERE'S HOW...

PAINT LEADS a hard life at the Diamond Alkali Company agricultural chemicals plant in Houston, Texas . . . and no ordinary paint can survive there for long!

A few reasons for paint failure: Processing vessels and storage tanks are subjected to spillage of chlorinated hydrocarbons and benzene, and some also to heat. In parts of the plant, painted surfaces are exposed to the highly corrosive fumes of hydrogen chloride and sulfuric acid.

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The Epon cold-cured paint, applied by spraying throughout the entire plant, has been in service for *more than two years with no failure.* Painting costs — for both material and labor—are a mere fraction of what they formerly were, reports Diamond Alkali.

Call on our sales offices for names of suppliers who sell Epon resin coatings for your needs. Write for the full Epon coatings story in the new brochure, *"Planning to Paint a Pyramid?"*

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The Allen-Bradley solder-type relay is the ideal protective unit, because neither time nor operating conditions can affect its accuracy. Nor can it easily be tampered with. Each relay must pass 5 tests before it is allowed to protect your motor—your assurance of dependable operation!

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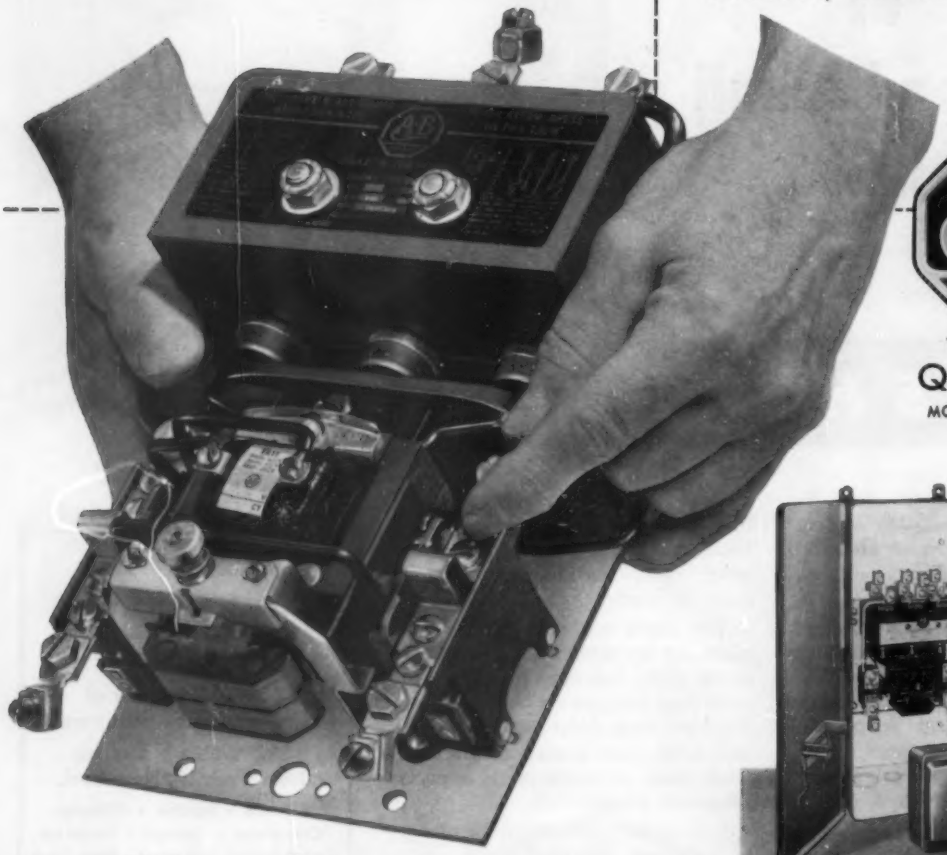

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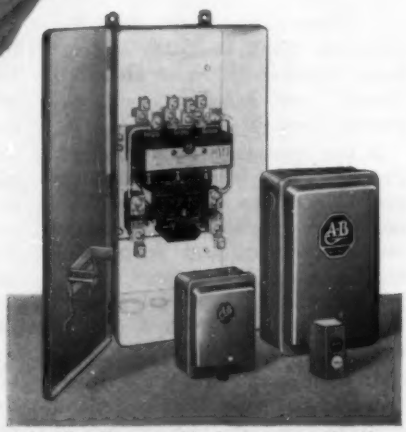

Allen-Bradley trouble-free, across-the-line, squirrel cage motor starters range from Size 0—1½ hp, 110 v; 2 hp, 220-440-550 v; to Size 7—300 hp, 220 v; 600 hp, 440-550 v. All are available in the various NEMA type enclosures.

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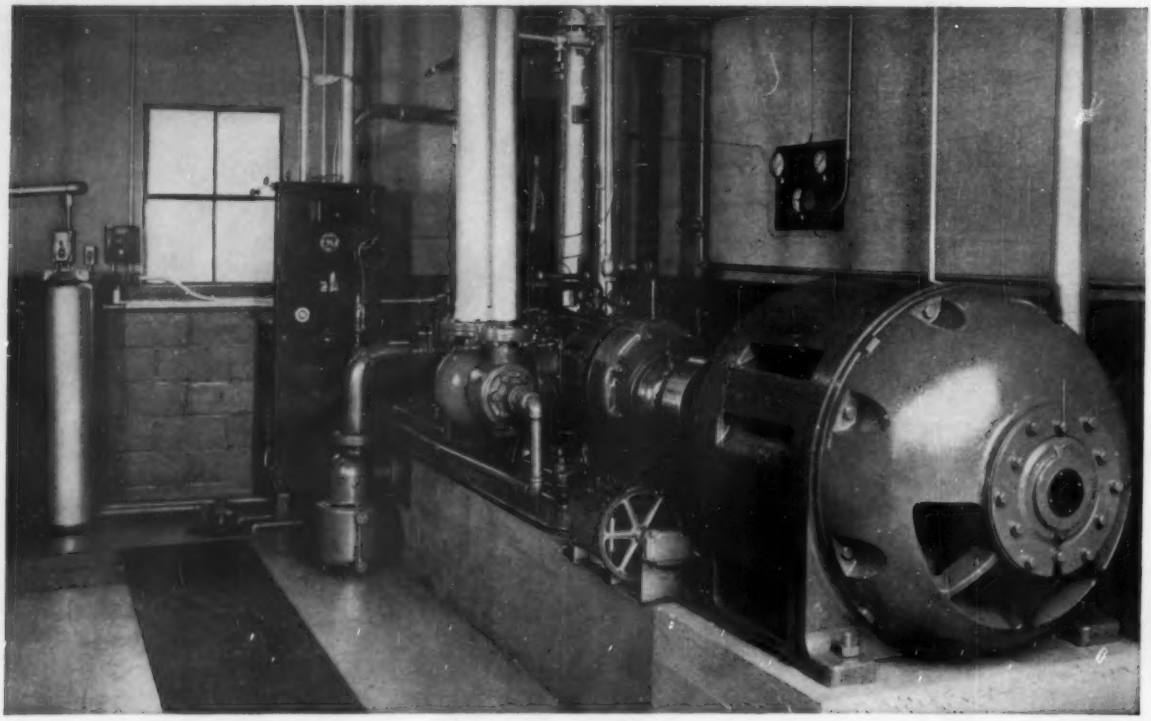

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Fuller Rotaries are built for capacities to 3300 c.f.m., 125-lb. pressure. For complete information, write for Bulletin C-5A.

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Fuller PIONEERS OF HIGH-EFFICIENCY VANE-TYPE ROTARY COMPRESSORS

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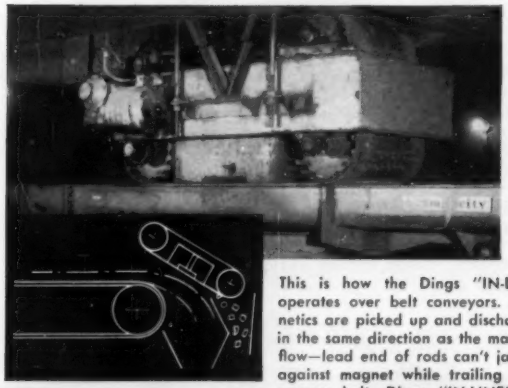
. . . Could have been saved by a

DINGS "IN-LINE" MAGNET



This is how the Dings "IN-LINE" operates over belt conveyors. Magnetics are picked up and discharged in the same direction as the material flow—lead end of rods can't jam up against magnet while trailing edge gouges belt. Dings "IN-LINE" RM Magnet is widely used over vibrating pan conveyors.

RIPPED, destroyed conveyor belts are the usual result of trying to separate long iron rods from belt burdens with ordinary suspended tramp iron magnets.

Dings new "IN-LINE" Suspended Self-Cleaning Magnet eliminates this risk. Its self cleaning belt moves in the same direction as the conveyor over which it is suspended. The "IN-LINE" picks up and discharges tramp iron in the direction of material flow.

You can see the difference this makes — the leading end of a rod can't jam up against the magnet face while the trailing end digs into and rips the belt.

The "IN-LINE" is a self-cleaning version of the Dings RM rectangular magnet—the most efficient ever designed for removing tramp iron from conveyor belt burdens. Available in standard sizes to meet almost any belt speed, width or burden characteristic requirements. Write today for a copy of the new Dings RM Catalog, 1315-A. A note on your letterhead will do.

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Dings

DINGS MAGNETIC SEPARATOR COMPANY

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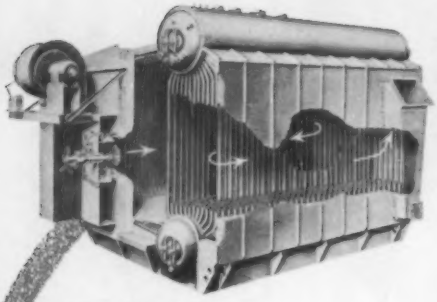
STANDARD BOILERS THAT SET INDUSTRY STANDARDS

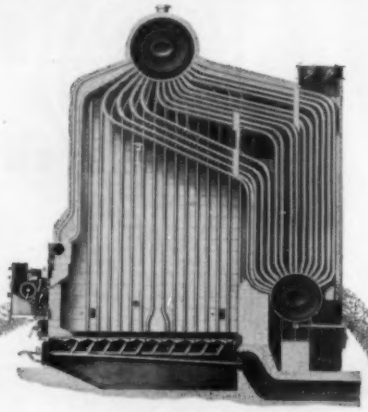
Whatever your steam needs, in the complete C-E line of fuel burning and steam generating equipment, you will find a type and size just right for you.

In the moderate capacity range, for example—from 4,000 to 120,000 pounds of steam per hour—the three *standardized* C-E Boilers shown here offer advantages of economy and performance that make them standout values in a wide range of applications.



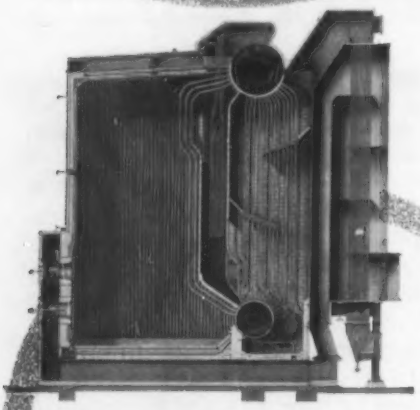
C-E Package Boiler, Type VP

4,000 to 40,000 lb steam per hr . . . pressures to 500 psi . . . for pressure firing of oil or gas . . . completely shop-assembled, needs only simple concrete slab for foundation. Has more water-cooled area per unit of furnace volume than any other boiler of its size and type. Large lower drum permits simple, symmetrical tube arrangement . . . great water storage capacity . . . easy access. Low-speed centrifugal fan is unusually quiet in operation. Simple baffle arrangement means low draft loss . . . simple soot blowing . . . no dead pockets . . . high heat absorption.



C-E Vertical-Unit Boiler, Type VU-10

10,000 to 60,000 lb steam per hr . . . pressures to 475 psi . . . superheat to 200 F in larger sizes . . . for coal, oil or gas . . . bottom-supported, needs no outside supporting steel. Boiler is efficient over a wide range of output, and is easy to operate and maintain. All parts are readily accessible for inspection. Regardless of fuel, the same general cross-sectional arrangement of drums, convection bank and furnace cooling is used. Uniform design through each transverse section assures even water level in drum, and uniform expansion.



C-E Vertical-Unit Boiler, Type VU-55

50,000 to 120,000 lb steam per hr . . . pressures of 250 or 500 psi . . . superheat and heat recovery equipment if desired . . . for oil or gas . . . bottom-supported, needs no outside supporting steel. This boiler is of symmetrical design. Thus gas temperature is constant across the full boiler width. The narrow, high furnace . . . integral design of boiler and preheater . . . absence of exterior ductwork . . . compactness—all help the VU-55 achieve standards of performance closely approaching that of large central station boilers.

Other C-E Industrial Boilers

In addition to the standard boilers shown here, Combustion offers many other 2-drum designs, for capacities to 350,000 pounds of steam per hour, for any commercially available fuel, for pressures to 1375 psi, and temperatures to 960 F. Heat recovery equipment is available. So — whatever your steam needs — call Combustion for details on the complete line of C-E Industrial Boilers.

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CONSTRUCTION BRIEFS — a review of fundamentals for the plant engineer

Prepared by Byron A. Engelbach, Plant Engineer

FLOOR LOADING

THE PLANT ENGINEER is constantly coming in contact with the problems of finding just how large a live load an existing floor will safely support. Such a problem will occur when a building is under consideration for lease, rent or purchase. Existing company buildings often require investigation because conditions may change sufficiently to require recalculation of the allowable safe load as re-affirmation of existing records.

There is a distinction which exists between the *Safe Strength* of a floor and the *Safe Load*. The *Safe Strength* of a floor should mean the maximum *Safe Load* for the beams, or joists, including the weight of the construction, flooring and ceiling, while the *Safe Load* refers to the maximum load which may be safely superimposed on the floor, exclusive of the weight of the construction. This being the case, it is obvious that the safe load is of more interest since the main consideration is how much load can be put on the floor safely.

The installation of additional surface, such as mastic flooring, tile or thin concrete layer to make trucking easier, adds dead load that could affect the amount of live load to the point where additional framing might be necessary. It is possible that the framing has deteriorated to the point where the floor is no longer able to support the original live load and a new safe load must be established for safety reasons. Whatever the case may be, the plant engineer may be called upon to make the investigation.

Although the actual computations are simple enough, certain assumptions must be made regarding the existing flooring, framing and materials, so broad experience, sound judgment, and a thorough knowledge of materials is required on the part of the engineer to insure a reasonably correct finding of safe loads on existing floors.

Safe Loading Problem

The problem of determining the safe load of an existing floor is the reverse of that presented in the previous Brief, when the framing was designed to support a predetermined live load. In presenting an example only the flexure, longitudinal shear and deflection will be investigated. In actual practice, all cases or stresses should be investigated. After the different stresses have been investigated a comparison of the results should be made and the smallest safe load determines the allowable safe load which the framing may support.

To illustrate the simplicity of the procedure and calculation, the following problem is presented:

Example 1.

A manufacturer of light goods has decided to lease additional space. The signing of the lease hinges on the plant engineer's report covering the allowable safe load the floor will support.

Refer to Fig. 1 showing sections through a typical floor. The building is some 300 ft long; the outside walls are masonry; the finished floor is ⅞-in. tongue and grooved oak which weighs approximately 54 lb per cu ft; the sub-flooring is square-edged short leaf pine weighing about 38 lb per cu ft; the floor joists are long leaf select yellow pine weighing 44 lb per cu ft. The bending stress of this type of timber in extreme fibers is 1600 lb per sq in., horizontal shear is 110 lb per sq in. and the modulus of elasticity is 1,600,000. (These unit stresses can be found in the AISC Handbook.) Inspection shows that all wood is free of dry rot, there is no excessive moisture present, and damage to the wood by chemicals or other factors is not evident. There is only a slight indication of cracks which are determined to be caused by normal seasoning. Therefore, there is no necessity to reduce the unit stresses.

The clear span of the joists is 17 ft

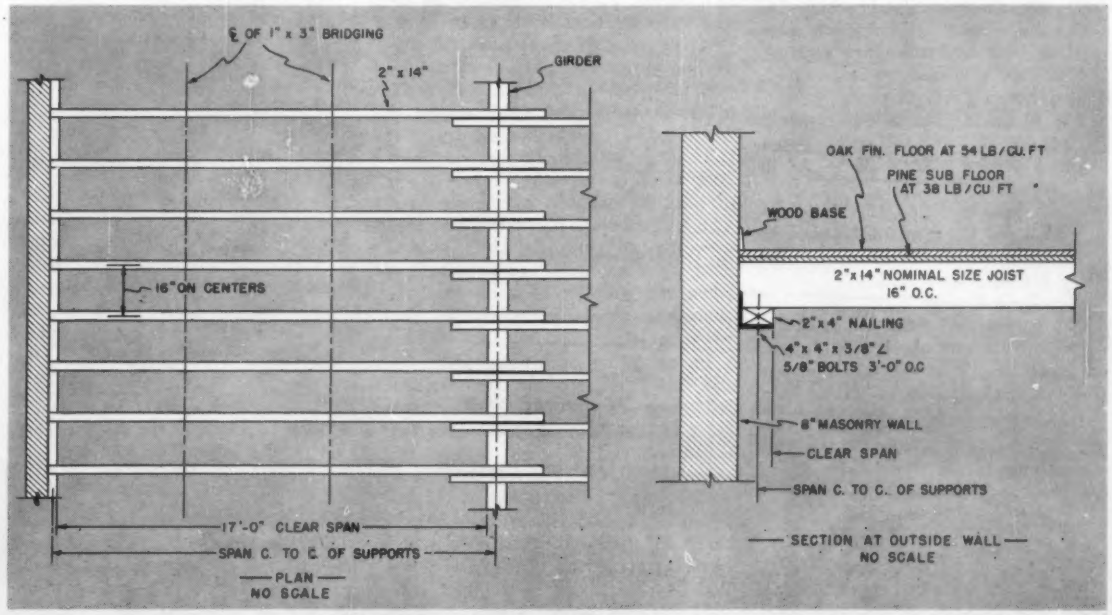

Fig. 1. Typical plan and cross-section views of flooring construction assumed for floor loading problem in text

and the span center to center of supports is 17 ft 4 in. For this problem the 17 ft dimension will be used.

The joists, dressed to 1⅝ in. by 13¼ in., are 16 in. on centers. The main girders will not be investigated in this problem.

Solution

Step 1. Investigate flexure resistance.

A. Find the moment of inertia of a dressed 2 in. by 14 in. timber. Use the formula,

$$I = \frac{b \times (h)^3}{12}$$

by substitution:

$$I = \frac{1.625 \times (13.5)^3}{12}$$

$$= 333$$

B. Find the max. bending moment that the joist will support using the formula

$$I = \frac{M \times n/2 \times 12}{f}$$

By substitution

$$333 = \frac{M \times 14/2 \times 12}{1600}$$

$$M = 6350 \text{ ft lb.}$$

C. Find the total uniform load per sq ft of floor. By substitution in the formula,

$$M = \frac{Wl^2}{8}$$

solving for W, the uniform load proves to be 1750 lb.

Since the joist has a clear span of only 17 ft, the load per lin. ft of joist equals 1750/17 or 103 lb. The joist spacing is 1.33 ft o.c. and the load per sq ft of floor equals 103/1.33 or 77 lb per sq ft. This figure 77 lb represents the total load, which includes the weight of the framing plus the live load which we are seeking.

Therefore a breakdown is required, to find framing weight per sq ft.

Fin. Floor = 1/12 × 54 = 4.5 lb per sq ft

Sub Floor = 1/12 × 38 = 3.2 lb per sq ft

Floor Joist = 2.33/12 × 44 = 8.5 lb per lin. ft or 6.4 lb per sq ft.

Then 77 — (4.5 + 3.2 + 6.4) = 63 lb per sq ft live load.

Step 2. Deflection.

The permissible deflection is determined by the formula 1/360 of span or 1/360 × 17 × 12 which equals 0.565 in. Substituting in the formula

$$D = \frac{5 \text{ W} \times (1)^3}{384 \text{ E I}}$$

and solving for W, the total uniform load can be found. Then:

$$0.565 = \frac{5 \times W \times (17 \times 12)^3}{384 \times 1{,}600{,}000 \times 333}$$

and W = 2720 lb

Then the load per sq ft equals 2720/ (17 × 1.33) or 120 lb

Therefore 120 — 14 equals 106 lb per sq ft of floor for permissible safe live load.

Step 3. Horizontal Shear.

Shear formula which should be used is

$$S_h = \frac{3V}{2bh}$$

By substitution in the formula, solving for V,

$$110 = \frac{3 \times V}{2 \times 1.625 \times 13.5}$$

V = 1610 lb

This represents only ½ of the total load causing the shear reaction of 3220 lb total uniform load which the joist will resist.

The actual load per lin. ft of joist will then be 3220 (17 × 1.33) or 142 lb. Subtracting the unit framing weight, 14 lb, live load equals 142 — 14, or 128 lb per sq ft.

Step 4. A summation of the findings for each stress is next in order.

Flexure	63 lb per sq ft
Horizontal Shear	128 lb per sq ft
Deflection	106 lb per sq ft

By inspection of the above it is determined that flexure is the determining factor in fixing the permissible safe load or live load which can be superimposed on the investigated floor. Therefore no greater load than 63 lb per sq ft can be added to the existing framing.

In this particular problem, no investigation of the angle which supports the joist at the outside wall is made or the anchor bolts which secure this angle to the masonry. This will be covered in a later Brief. In actual practice the engineer would most certainly make an investigation of all the existing conditions such as the compressive strength of the joist, the supporting girder, the columns which support this girder, and the masonry wall, otherwise the report which should be submitted will not be complete.

There is little doubt that the engineer would use already prepared tables to find the solution to the problem. The long method illustrated has been presented to give the basic method used when no tables are available, or when the problem is such that the conditions preclude the use of prepared tables.

In compiling and using tables of safe loads for wooden framing, the following important consideration must be kept in mind by the designing engineer.

1. Unseasoned timber is very much weakened by moisture content. Unless otherwise noted, tables are generally compiled using fiber stresses which have been fixed by test, experimentation or other exact method for commercially dry timber. Timber containing 10 to 15 per cent moisture has been found to be appreciably weakened.

2. When timber has large or loose knots it is weakened appreciably and is graded below Select or Common, and the unit stresses must be reduced to compensate for the weakened timber. Only the experienced design engineer can or should attempt to establish the unit stresses to be used in framing calculations in such cases.

3. In applications where impact loads must be considered, the unit stresses should be reduced. No explanation of such loading has been presented. It will be covered later.

4. When continuous, heavy loading is superimposed on timber framing, relatively low stresses should be used.

5. Commercial dimensions are smaller than the nominal dimensions. Use of full dimensions in arriving at loading per sq ft is on the safe side in calculations. However, in computing moments of inertia the nominal sizes should never be used. This use of the

6. Timber deteriorates with varying rapidity which depends on existing conditions. The design engineer should take this into consideration to insure that a proper factor of safety is used.

Correction for Timber Condition

7. The modulus of elasticity for unseasoned timber should be reduced approximately 50 per cent from its tabulated value for commercially dry timber. It should be noted that such a reduction will greatly increase the deflection and appreciably affect the safe load.

8. It is good engineering practice to compute tables of safe loads based on conservative stresses for average or poor conditions, or to reduce tabular loads found in tables which have been computed for ideal conditions and seasoned timber and then increasing the values found or given when conditions are ideal, rather than find or use values suited to conditions which generally do not exist.

As an illustration of the above notes, refer back to the problem. Assume that the timber is unseasoned and apply the correction to the solution for deflection. In the illustrative problem the modulus of elasticity was 1,600,000. Under the conditions we should reduce this figure to 800,000. Then

$$0.565 = \frac{5 \times W \times (17 \times 12)^3}{384 \times 800{,}000 \times 333}$$

= 1360 lb which is the total uniform load on the joist. The load per sq ft of floor equals 1360/(17 × 1.33) or 60 lb.

Of course, all the other fiber stresses would be reduced. A summation of the findings would be appreciably different, resulting in a reduction of the permissible safe load which could be superimposed on the joist.

How to Figure the cost of STEAM TRAPS

1. PRICE—you get a lot of trap for your money when you buy an Armstrong: big capacity in small size; the long-lasting mechanism in traps for low and medium pressures is identical in design, workmanship and materials, to that in traps for 900 degrees, 950 lbs. pressure!

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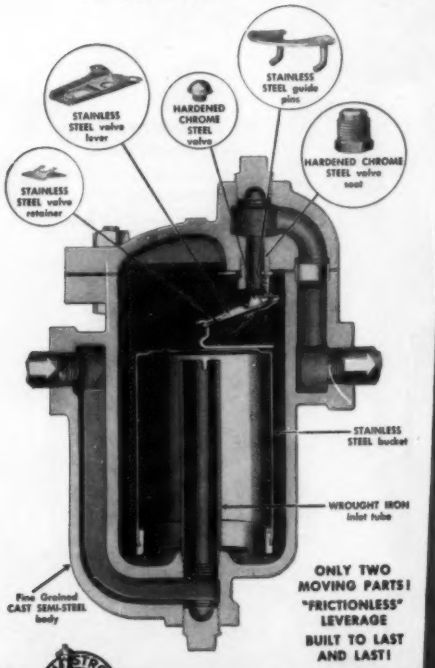
STAINLESS STEEL valve lever
HARDENED CHROME STEEL valve
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STAINLESS STEEL valve retainer
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Choice of body styles?	Yes
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Available with internal check valves?	Yes
40 years inverted bucket trap experience?	Yes
Guaranteed *unconditionally* to satisfy?	Yes

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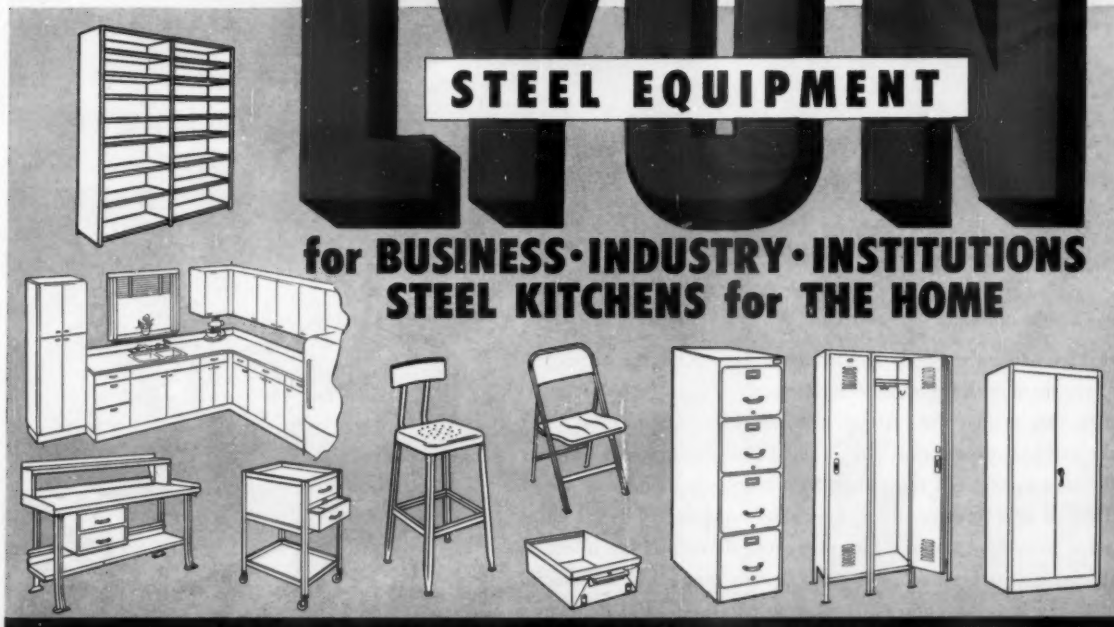

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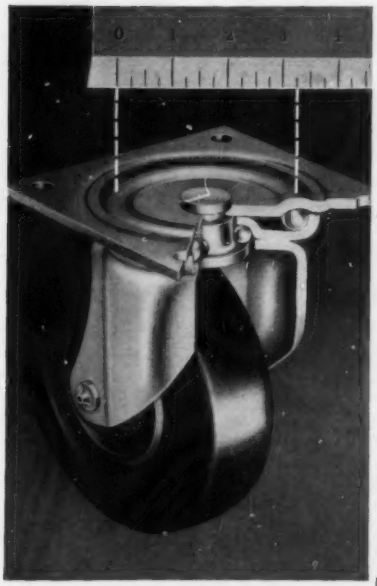
MATERIALS-HANDLING NEWS

★ Panel Discussions by Bassick, World's Largest Manufacturer of Casters and Floor Protection Equipment ★

Bigger swivel bearing area keeps heavy loads steady



Reduces raceway wear, gives longer life, easier swiveling

Important in caster design is the diameter of the main swivel bearing and balls.

The larger this area, the greater the safety factor with proportionately less wear and tear on the caster. Avoid premature caster failure by specifying Bassick's — all have extra-quality design features. The Bassick series "99" quality, double ball bearing casters have a main swivel bearing diameter at least 1⅛ inch greater than the wheel tread width — for easier swiveling and *more-for-the-money* service.

Compare these dimensions with the casters you now use. Your best bet in the long run is Bassick's — they roll and swivel easier and last longer under hard service.

Dripping grease harms floors, boosts your maintenance costs

Sights like this can be a thing of the past in your plant, now that Bassick has perfected its new "3D" caster — no Drip, no Dirt, no Drag. Floor surfaces and rubber wheel treads are safe from damage by leaking lubricant because exclusive Bassick design features seal in grease, seal out dirt or other foreign matter. Write for new catalog sheet 3D99-53.

File test shows extra hardness of Bassick swivel bearing parts

If file bites into raceway surfaces of casters you now use, better think about buying Bassick. Double ball bearing swivel parts of all Bassick cold-formed steel casters are full case-hardened to 15N90 Rockwell. They'll pass your test with flying colors, pay off for you in extra years of wear.

1954, meet 500 B.C.!

U. S. Army Photograph

This striking photo does more than compress history into a single vivid shot of old and new crossing paths in the Orient.

For the lumbering ox-cart with its tremendous wooden wheels isn't much more out of date than some materials-handling systems we've seen in use today. Old-style, inadequate casters are about as far behind Bassick's new 16" "Floating-Hub" caster (below) for 20-mph service, for example, as the ox-cart is behind the airplane.

The safest way to protect cargoes susceptible to shock damage during transport is through use of Bassick's "Floating-Hub" shock absorbing casters and wheels. Write for new "Floating-Hub" catalog FH-53.

New 20-mph caster.

Modernize with Bassick

Your Bassick industrial distributor is the man to see for facts and figures on the most up-to-date line of shock-absorbing and conventional casters. Or you can write to Bassick direct.

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Yarway High Pressure Boiler Water Gage with separated-design flat glass inserts. Write for Yarway Bulletin WG-1812.

HE'S A SPECIALIST ON STAINLESS STEEL INLAYS

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He's a Yarway craftsman. In the picture above he is milling a gasket groove in the stainless steel facing that is used for this important part of a high pressure boiler water gage body.

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The man is typical of the skilled workmanship that goes into every Yarway gage, blow-off valve, steam trap or other product —workmanship that makes no compromise with quality.

The stainless steel facing is typical of advanced Yarway engineering design. That inlay is but one of twelve basic improvements made in Yarway high pressure water gages.

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STEAM TRAPS
STRAINERS
SPRAY NOZZLES

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WATER ALWAYS CAUSES TROUBLE

Here, as the author says, is not a neatly catalogued list of things to do to your water supply to assure no trouble at all . . . He simply points out how and where the plant engineer may run into trouble around any watery corner . . . And he recalls a lot of examples to prove his point: If you're fooling around with water, it's serious business

By DR. EVERETT P. PARTRIDGE, Director, Hall Laboratories, Inc.

MAYBE YOU ARE one of the few plant engineers who don't have to worry about the troubles caused by water. You buy all your power, so you don't have any boilers. You don't do any processing which requires cooling. You heat your building with hot air. Your management doesn't even see any need for air conditioning. No water is used in your process work. Even the water you drink is supplied in glass bottles by the Daisy Dew Water Company!

If you are such a plant engineer, you are twice lucky. You have none of the problems which crop up inevitably whenever water must be used in industry. And you can save time right now by turning to the next article. The other 99 out of each 100 readers who have persisted this far may wish to continue because they have to live and work with water whether or not they like it.

For these plant engineers, the present article will try to talk about water problems, not in the usual neatly catalogued way that implies that every problem has been solved, but instead from the viewpoint of the engineer himself, harassed by the dents put in production curves by corrosion and deposits and other difficulties caused by the 80 billion gallons of water that industry in the United States uses each day.

Water Causes Maintenance

How much of your maintenance is due to difficulties with water cutting into your capacity to produce? How many of the dollars now spent on maintenance could be more profitably invested in getting to the root of the troubles which eat up labor and scarce materials in addition to the loss in products not produced?

Let's consider some typical items of maintenance: traps and piping which return condensate from steam-heated equipment to the boiler plant; condensers and other heat-exchange equipment cooled by water, the boilers to which both the condensate and the water warmed up in the heat exchangers may be supplied for makeup.

Condensate Lines, Traps—When a foreman brings you a failed nipple removed from a condensate line, is it grooved more or less continuously along the bottom, like the one represented in Fig. 1? If so, the chances are good that your condensate is being kept at least slightly acid by carbon dioxide.

But where did the carbon dioxide come from? Probably it is being supplied continuously by the bicarbonate in the feedwater for the boilers that make the steam. In the boiler the carbon dioxide is too volatile to stay in solution, so it passes out into the system with the steam. As soon as a droplet of condensate forms, however, some of the carbon dioxide dissolves in it. Even though the resulting solution of carbonic acid may be extremely dilute, it nevertheless can slowly dissolve any steel surface over which the condensate runs.

As plant engineer, it is part of your job to see if there is not a cheaper way of meeting this problem than simply replacing piping which may fail at critical points every few weeks. But you are no expert on water problems nor do you have much free time to investigate the cost of alternative procedures or the likelihood that they will be effective. If you turn to your plant laboratory, you may well find that the chemists there, expert as they may be in the specific details of your plant's processing operations, actually have no more intimate knowledge of industrial water than you have yourself. Also, they too are busy.

If you have the kind of management that can be persuaded to get as much help as possible from concentrated sources of know-how outside of the company, you can lay your troubles in the laps of any one of several organizations specializing in industrial water. After the significant factors in your case have been properly weighed, you may get one or more of three most probable recommendations:

1. Make the capital investment necessary to remove most of the carbon dioxide from the feedwater.
2. Add a volatile alkali, such as an organic amine, to your system so that it will neutralize the carbon dioxide in the condensate.
3. Add an inhibitor, such as a film-forming amine, which will coat the metal surfaces and keep the condensate from actually making contact with them.

You should get a serious consideration of the special factors in your case and an explanation of why one of these alternative courses of action seems best for you.

Instead of grooving along the bot-

Dr. Everett P. Partridge

Dr. Everett P. Partridge has been working to prevent the troubles caused by water ever since he threw his diploma from Syracuse University into the trunk in 1925 and set out for the University of Michigan, where he spent the next three years as Detroit Edison Fellow in Chemical Engineering. Out of this came the degree of Ph.D. and a monograph on "Formation and Properties of Boiler Scale."

Later he became supervising engineer of a station of the Bureau of Mines. While there, he was in charge of the investigation sponsored by the Joint Research Committee on Boiler Feedwater Studies.

In 1935 he was invited to join Hall Laboratories, Inc., as director of research. Upon the retirement of Dr. Hall in 1950, Dr. Partridge became director of Hall Laboratories.

Fig. 1. Section of condensate return line which has been grooved by condensate found to contain some carbon dioxide

Fig. 2. Condensate line which has been plugged with iron rust which came from corroded unit heaters on the line

tom, your condensate lines may exhibit a different type of disease. Perhaps your maintenance crew is forever cleaning rust out of traps in order to keep them operating, or removing plugged return lines from unit heaters like the one shown in Fig. 2. Or maybe they must frequently replace pipe, not because it is grooved but because numerous pits have finally chewed their way through to the outside, as illustrated in Fig. 3. If you have had this experience, chances are that your condensate system is under vacuum at least part of the time and is sucking air in through every possible channel.

Corrosion Caused by Oxygen

This situation is fundamentally tougher to meet than corrosion due primarily to carbon dioxide. Much can be done, however, to minimize inleakage of oxygen and to combat its action as an accelerator of corrosion. The specialists on water whom you select to work with you on your problem may quite likely wish to insert corrosion measuring devices, such as those shown in Fig. 4, at specified points in your system. Determination of the rate of corrosion before and during treatment with an amine will then give you an objective measure of what is actually being accomplished. As in any case of corrosion, you must not count on complete prevention but on control within some limits representing an economic balance between the results achieved and the cost of getting these results.

Savings from an engineering study may run into real money. In one large plant a recent survey indicated that corrosion of process equipment by condensate was costing at least $50,000 per year for replacement alone, with about $30,000 annually in addition for maintenance of return lines and accessory equipment. While treatment with an effective inhibitor would not be cheap, the cost would amount to only one-fifth that of the current corrosion.

Condensers, Coolers, Heat Exchangers—If your steam is as pure as it normally should be, about the only trouble it can cause in plant processes is corrosion after it has condensed. Water used for cooling, on the other hand, can be nasty in a great variety of ways. In addition to corroding the heat-transfer surfaces, it can foul them so that the capacity can only be maintained by frequent outages for cleaning.

When you are called out into the plant to look at the sad condition of the tubes in a heat exchanger, can you tell at a glance the real cause of the trouble? The specialist on industrial water may be able to do so because of his long experience and his knowledge of how your water should behave. Probably, however, he will want to reinforce his opinion by facts obtained in his laboratory.

Let's assume, for example, that the tubes are covered with a rusty, slimy gunk. Is this a sign that the equipment is corroding or does it mean that the cooling water carries dissolved iron from some underground deposit? Or have iron-fixing bacteria decided that your heat exchanger provides just the living conditions they desire? If you mistakenly assume that you have a corrosion problem on your hands, your prolonged efforts to meet this supposed difficulty may fail completely to faze the iron bacteria which may be the real heart of the problem.

Choice of Remedies

But if the water used for cooling really is boring holes in your heat exchangers and piping, what is the practical method for you to use in cutting costs? If you review what has been written on the subject in the past decade, you will come up with a confusion of proposed alternatives:

1. Get rid of dissolved oxygen by: (a) mechanical deaeration at atmospheric temperature; (b) chemical deaeration with sodium sulphfite activated with cobalt chloride.

2. Lay down a scale of calcium carbonate, controlling its thickness so that it protects the metal without interfering seriously with heat transfer.

3. Develop a protective film on the metal surfaces by treatment of the water with: (a) chromate; (b) complex phosphate; (c) chromate plus complex phosphate; (d) soluble oils; (e) other organic chemicals, natural or synthetic.

What will be the best solution to your specific difficulty? As always, the answer depends upon the specific conditions. To give maximum protection to the cylinder liners in a Diesel engine, most consultants will recommend chromate, emphasizing high concentration and the control necessary to

avoid a drop which could cause localized pitting. On the other hand, in a recirculating condenser cooling system, the optimum treatment for control of corrosion may well be treatment with only a few ppm of a complex glassy sodium phosphate.

Just as a clinic devoted to medical diagnosis uses a variety of techniques to find out what may be wrong with you, the organization specializing in industrial water may need to employ not only chemical analysis, but also such specialized instruments as the spectrograph, the polarizing microscope, the biological microscope, X-ray diffraction, and the metallograph to get the facts on some complex problem.

Dealing with Scale

In contrast, if a sample of dense scale from a heat exchanger operating on a hard bicarbonate water fizzes violently and dissolves completely when a drop of acid is placed on it, the specialist may assume without much danger of being wrong that he is dealing with a scale which is predominantly calcium carbonate. Like the family doctor who can tell quickly that Johnny has the measles, the man who has lived for years with industrial water can diagnose certain problems readily without having to draw upon his entire scientific resources.

Well, suppose you did have a hard scale in the heat exchanger and it did fizz and dissolve completely in acid, what could be done to keep the heat exchanger clean? The most practical answer in the majority of cases has been to provide one or two pounds of complex phosphate glass in each million pounds of water passing through the unit. By a neat trick of physical chemistry which apparently involves the isolation of crystal nuclei as rapidly as they appear, the water is stabilized so that it will not deposit calcium carbonate on the tube surfaces.

On occasion, the hard scale in a heat exchanger doesn't dissolve in acid with effervescence. In one interesting case the deposit turned out to be calcium fluoride. Some imagination and some investigation were required to discover the origin of this to be a glass plant dumping its waste etching solution of hydrofluoric acid a few miles upstream.

Evaporators, Boilers—It is more difficult to keep heat-transfer surfaces clean where water is being boiled than where it is merely being warmed up. Nevertheless, the scaling of evaporators in the beet-sugar industry can be materially retarded by the same type of treatment used for stabilizing cooling water. An extension of this to salt-water evaporators aboard oceangoing ships has been made possible by the judicious combination of organic and phosphate inhibitors selected after systematic experimentation in the laboratory and proved by performance aboard ship on the seven seas.

A whole new set of problems requiring different specific chemical treatments for their solution pops up in the boiler plant. Whether you are making steam only for process use or only for power or are doing both by bleeding process steam from your turbine, you want your boilers to behave themselves so that production won't be curtailed by unscheduled outages. But do you know what can be done to keep your boilers on the line and do you really know in detail what actually is being done?

Every plant engineer has probably wished at some time that there were a concise little table in an up-to-date handbook somewhere which would tell him what he should do to make the optimum boiler feedwater from the particular supply of raw water available to his plant. Such a simplified approach has been attempted hundreds of times in technical articles, but can you find in any of them the immediate and sound answer to your particular case of blistered wall tubes? By the time the possible pertinent factors have been considered, the simple little table has become an encyclopedia.

Diagnosing Troubles

Consider those blistered wall tubes more closely. It takes no laboratory full of special equipment to tell you that the steel was overheated far beyond the normal range of operating temperature; the blisters themselves tell you that. But what sort of resistance to heat transfer on the inside of the tubes was responsible for the overheating? Perhaps you find a deposit. Is it scale or sludge laid down by the water, or is it iron oxide formed from the tube metal itself? Here you begin to need the special chemical and instrumental techniques for analyzing the deposit and identifying its constituents and the know-how for building an intelligent diagnosis from the facts.

Perhaps the deposit turns out to be hard, brittle and essentially calcium sulphate. Well, the operators obviously had not been maintaining proper control on internal conditioning with phosphate; had they accepted instead the claims for some miraculous compound or some even more miraculous gadget purporting to prevent every kind of difficulty by super-scientific electrical or catalytic means?

Perhaps the scale is more complex,

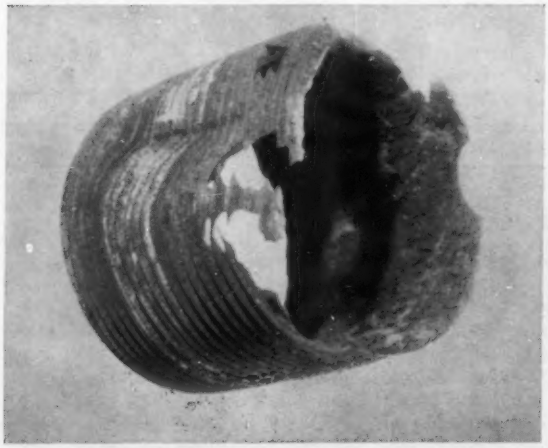


Fig. 3. Nipple from condensate line which has pitted as result of inleakage of oxygen caused by vacuum in system

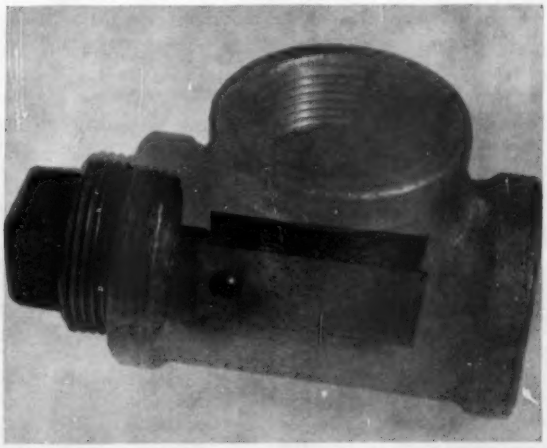


Fig. 4. Phantom view of double test strips used for measuring corrosivity of condensate before and after treatment

with significant amounts of sodium aluminum silicate and even relatively water-soluble substances such as sodium phosphate and sodium sulfate in it. Here it is necessary to begin to think in terms not only of physical chemistry but also of fluid flow and heat transfer. What caused this locality in the wall to become a "hot spot" where boiler water could concentrate to such an extreme degree as to lay down these constituents?

Instead of blistered wall tubes, your trouble may have been a cracked nipple in a blowdown line, or a corroded economizer, or loss of capacity in a turbine, or sticking of a feedwater regulating valve. Or the tubes that failed did so not because of blistering but because of internal attack on the side towards the furnace without any accumulation of corrosion products. Perhaps the damage looked like that in Fig. 5. This was a horizontal tube from a waste-heat recovery boiler in a plant manufacturing sulphuric acid from smelter gases. The detailed discussion of this kind of attack by the water would turn up in the ninth volume of the hypothetical encyclopedia under "Steam Blanketing." Complete study might even show that you were experiencing "hydrogen embrittlement" as an extra added complication, although this would be less likely.

Procurement of Water

Urged gently by your company's salesmen and advertising experts, the world has beaten a path to the door of your plant to demand the better mousetrap you are making. Perhaps you even have a defense order for spring clips which will require doubling your facilities. Naturally, you ask a whole series of questions. When you get around to water, you wonder: New water supply? How will it behave? Corrosion? Scale? What can we do to anticipate and to obviate trouble? Soften? Decarbonate? Demineralize? New boilers? Cooling towers? Threshold treatment?

Before anyone can convert these questions into recommendations, a lot of facts must be determined. Whether you should or should not have a new boiler plant can be and probably will be settled by a study of process requirements for steam and the comparative costs of purchased power, power made in your existing plant, and power made in your proposed plant. Selection of a source of water, however, may be more important and more difficult than the decision to buy or to make power because you are faced with making the water behave in all of your uses in the plant as well as the question of its continued availability.

"Typical" Water Supplies—One of the delusions commonly encountered is that natural waters may be classified into a few simple types, for each of which a specific treatment is indicated. It is true that a surface water in New England will generally be rather soft and a well water in the midwest rather hard. But what will be the content of organic matter in the former and what will be the content of dissolved iron in the latter? The answers are not predictable, but they may be most important to the successful operation of a plant.

Because surface water supplies in some parts of the country are quite soft, it is sometimes assumed that all rivers and lakes are low in hardness. But at Pittsburgh, Pa., where the Allegheny and the Monongahela join to form the Ohio, the hardness during a fall drouth has been known to go well above 200 ppm as compared to 40 ppm during a spring run-off. Similar variations show up in the water of many other rivers, for example, the Des Moines at Ottumwa, Ia. Here, however, the hardness is largely calcium bicarbonate derived from limestone, while at Pittsburgh it is largely calcium sulphate as a result of drainage of sulphuric acid from abandoned coal mines. Some representative values for these and a few other water sources are shown in Table I.

It is interesting to note that the hardness of the Great Lakes more than doubles from Duluth at the western end of Lake Superior to Chicago at the southern end of Lake Michigan or Oswego near the eastern end of Lake Ontario.

Local Variations

Turning back to underground water supplies, it is even possible to get entirely different waters from wells in the same location but of different depth. An example is afforded by Houston, Texas, where the water from one stratum was found to be essentially sodium bicarbonate with a hardness of only 4 ppm while that from another stratum was also bicarbonate, but showed a hardness of 182 ppm. Similar differences have been reported at many other places. Not only the hardness, but also the content of iron and of dissolved solids is likely to vary greatly from one water-bearing stratum to another. An underground water supply may carry a high content of dissolved salts, as at Wichita, Kansas.

When other industrially important criteria, such as silica and suspended solids are considered as well as hardness, iron, organic matter and dissolved solids, the attempt to classify waters in a few simple types simply blows up. But why attempt to classify in the first place? The important need is to know what water is available, how variable it will be in quantity and composition, and under what specific conditions it will be employed for various purposes within the proposed plant.

If the water consultant is given the opportunity to develop all such pertinent information while the plant is

Table I. The variety in the chemical composition of water supplies from various parts of the country is shown here

Source of Samples	Location of Source of Samples	Water Level	Significant Constituents of Water, parts per million								
			Dissolved Solids	Hardness as $CaCO_3$	Silica SiO_2	Iron Fe	Calcium Ca	Magnesium Mg	Bicarbonate HCO_3	Sulphate SO_4	Chloride Cl
Allegheny River	Pittsburgh	low	360	209	4	0.1	64	12	2	173	32
	Pittsburgh	high	63	43	5	0.3	15	1	10	26	8
Des Moines River	Ottumwa, Ia.	low	492	406	18	0.1	100	38	412	107	8
	Ottumwa, Ia.	high	207	116	29	1.2	30	10	99	52	4
Lake Superior	Duluth	constant	84	56	4	0.1	16	4	53	3	2
Lake Michigan	Chicago	constant	157	125	6	0.2	34	10	146	12	5
Lake Ontario	Oswego, N. Y.	constant	159	127	6	0.4	37	8	114	22	13
Wells, West End	Houston	constant	314	182	—	—	45	—	260	12	50
East End	Houston	constant	397	4	—	—	2	—	402	1	38
Wells	Wichita	constant	1500	411	14	0.2	117	29	244	234	552

still in the planning stage, he can help to avoid a great deal of grief after the plant is placed in service.

Not Enough Water—What can be done when a plant has to have more water than it can draw from available sources?

The first approach to this problem might well be another question: Well, how much water does it really need? Perhaps your plant was one of the many laid out with no concern for the re-use of anything as cheap and as universally available as water is sometimes thought to be. If so, then the ultimate answer may be that you have more than adequate water, provided you will apply good engineering management to the way it is used.

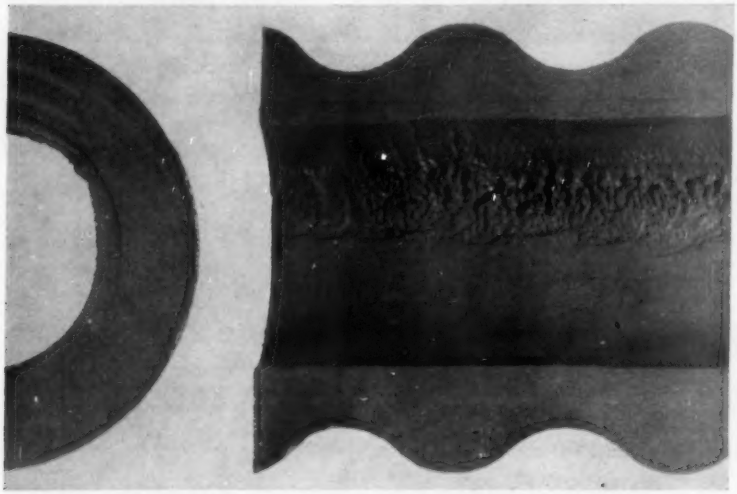


Fig. 5. Corrosion along upper part of horizontal tube in waste heat boiler in plant manufacturing sulphuric acid. Corrosion was caused by high local concentration of an alkaline boiler water on hot tube which was blanketed by steam

Should a real lack persist after every possible economy has been adopted in the re-use of water within the plant, then the answer obviously has to be: Get more water from your available sources.

If the source is a stream, what can be done to store water from the periods of high run-off? Given suitable terrain, modern earth-moving machinery can create reservoirs at costs worth consideration. On the other hand, if you need more water from wells, you may be able to double the present flow by an inexpensive chemical treatment to disperse and flush out clay and other fine particles clogging the water-bearing stratum adjacent to the well.

A warning is in order at this point. Water must flow to your well as fast as you withdraw it. If the bottleneck is near the well, then chemical cleaning will help you. If the bottleneck is beyond the zone you can reach with practical chemical treatment, then you may have to drill new wells or seek another source.

Most of the water entering your plant must also leave it, carrying with it the contaminants picked up in your cooling or processing operations. What can be done to clean up this plant effluent? At first glance, it always looks as if you were faced with a problem that had no practical solution. But what are the basic facts? What contaminants are present in the waste water? From what specific operations do they come? How much water is used in these operations? Could the amount in each operation be reduced? Could these streams be reused or segregated for treatment or combined under proper control to facilitate treatment?

Getting the answers to such questions is the essential first step toward an economical solution of any plant's waste-water problems. Flows must be measured rather than guessed. Concentrations of contaminants must be determined throughout the operating cycle. Opinion must be supplemented or supplanted by engineering fact—with results which often are unexpected.

In one case, a textile mill had numerous points of discharge. The first phase of the investigation, a survey to determine facts, revealed that wastes requiring treatment were being discharged at only five locations. Of these, two lines accounted for most of the volume. The second phase comprised a search for practical changes in operation which would minimize the amount of objectionable waste discharged. Recovery of caustic by counter-current rinsing in one operation and its use in a second operation were recommended. Wastes from the various drying operations constituted a problem requiring laboratory study in the third phase of the investigation, now in process. Coagulation experiments were successful, but estimated chemical costs were so high that an alternative method of destroying the waste is being studied.

Water Management

As of 1950, industry in the United States was estimated to be using 80 billion gallons of water per day. The prediction for 1975 is an increase of 170 percent in this use of water for production of power and manufacture of goods. Inevitably, there will be required more and more cooperation in the procurement, treatment, use and reuse, and ultimate disposal of water needed, not just by one plant in a locality, but by many. Water management will become progressively more essential, year by year.

Water management consists not merely of getting facts, diagnosing troubles, making recommendations. Unrelenting supervision right at the points where things happen is the final requisite that determines whether or not the previous effort pays off.

This continuing service catches all sorts of little errors which might have caused big troubles. For example, instead of purchasing certified reagents for the control tests, the plant may make up its own. There is a subsequent great increase in the consumption of a treatment chemical. Looking into this, the field engineer finds the test reagent to be just ten times the proper strength, quietly gets the control back on the beam. In another plant he may trace down unexpected hardness attributed to poor performance of the softener, finding the real cause to be a valve left open on a cross-connection to the raw water line. In still another, he may have to win over an operator obsessed with hoarding every last Btu to the idea that venting some steam is less expensive than replacing tube bundles otherwise subject to rapid attack by pocketed gases.

What will the future bring? What new developments will help to make water behave? Will the expenditure of millions of dollars provide an economically attractive process for recovering a generally useful water from the vast reservoirs of the oceans? Perhaps—yet, for the foreseeable future our thesis seems likely to stand:—Water always causes trouble and must be made to behave!

View of general session of last year's Plant Maintenance and Engineering Conferences, held at Conrad Hilton, Chicago

Program of Plant Maintenance And Engineering Conference

HUMAN RELATIONS aspects of plant upkeep will be the theme of this year's Plant Maintenance and Engineering Conference, which will be held in Chicago at the International Amphitheatre from January 24 to January 26. Morning conference sessions will be held at the International Amphitheatre and evening sessions will take place at the Palmer House.

Two of the three general sessions will consider human relations problems. Emphasis will be on such subjects as getting along with unions, worker motivation and morale, communicating information and selection and indoctrination of personnel.

Specialized aspects of maintenance to be studied include electrical distribution, electronic controls, lighting, corrosion, lubrication, power plants, materials handling, safety, protection, fire prevention, buildings, sanitation, maintenance manuals and similar subjects.

Here is a brief outline of the conference program, to permit plant engineers to check off the conferences they plan to attend.

Monday Morning, January 24
10:00 a.m.-12:30 p.m.
General Session at Amphitheatre

Following the opening remarks by the general chairman of the conference, the first session will be a panel discussion. The subject will be: What Management Wants From the Maintenance Program and What Maintenance Wants From Management. W. J. Allaback, plant manager, Thew Shovel Co., Lorain, Ohio, and Robert E. Horstman, factory manager, Robbins & Myers, Inc., Springfield, Ohio, will take the side of management.

David T. Godschall, plant engineer, Heintz Manufacturing Co., Philadelphia, Pa., and R. E. Stroppel, plant engineer, Tool Steel Gear & Pinion Co., Cincinnati, Ohio, will present the maintenance viewpoint.

Monday Evening, January 24
8:00-10:00 p.m.
Concurrent Conferences at Palmer House

Subjects to be discussed at the eight concurrent conferences scheduled for the evening will cover:

1. Maintenance and Construction of Plant Buildings. W. E. Chandler plant engineer, Queeny Plant, Monsanto Chemical Co., St. Louis, Missouri, will be the discussion leader.

2. Control of Maintenance Activities in the Process Industries by Means of Standardization and Labor Measurement. Frank O. Pierson, chief manufacturing industrial engineer, and Edmund C. Newton, administrative assistant, both of Point Breeze Refinery, Atlantic Refining Co., Philadelphia, will be discussion leaders.

3. Organization of the Maintenance Force. Discussion leader will be G. Russell Carpenter, general plant engineer, Minneapolis-Moline Co., Minneapolis, Minn.

4. Maintenance Cost Control. Discussion leader will be Lester C. Leach, Plant Engineer, Dennison Mfg. Co., Framingham, Mass.

5. Sanitation. This will be a panel discussion covering such subjects as: Development of Production Standards for Sanitation; Organization Sanitation in Research Laboratories at G. M. Technical Center; and Upgrading the Worker in a Modern Sanitation Program.

6. Work Measurement and Work Standards. Edward F. Mann, senior project industrial engineer, Atlantic Refining Co., Philadelphia, will be the discussion leader.

7. Preventive Maintenance—What's Good About It. Discussion leader will be Herbert N. Johnston, plant engineer, Philco Corp., Philadelphia.

8. Training the Maintenance Force. Frank K. Welch, director of training, Carrier Corp., Syracuse, New York, will be the discussion leader.

Tuesday Morning, January 25
9:30 a.m.-12:30 p.m.
General Session at Amphitheatre

The panel discussion subject for this general session will be: Planning and Scheduling Maintenance Work. Panel members will discuss: Advantages of Planning and Scheduling; Limitations of Planning and Scheduling; Planning and Scheduling in a Large Plant; and Planning and Scheduling in a Medium-Size Plant.

Tuesday Evening, January 25
8:00-10:00 p.m.
Concurrent Roundtables at Palmer House

Sixteen concurrent roundtables are planned for the Tuesday evening session.

1. Maintenance of Electronic Control Equipment.
2. Maintenance of Electrical Distribution Equipment and Lighting.
3. Corrosion Control and Prevention.
4. Lubrication—Setting Up Charts and Schedules; Standardization.
5. Maintenance Stores and Storekeeping.
6. Use of Punched Card Systems in Maintenance.
7. Safety, Protection and Fire Prevention.
8. Project Scheduling, Estimating and Control.
9. Maintaining Power Plant Equipment.
10. Materials Handling Equipment used in Maintenance.

The above-named subjects will be repeated on Wednesday evening.

11. Maintenance Manuals—Content, Preparation, Use.

The five remaining roundtable discussions will tell what part maintenance is playing in chemical plants, food plants, paper mills and paper product plants, steel mills and textile mills.

Wednesday Morning, January 26
9:30 a.m.-12:30 p.m.
General Sessions at Amphitheatre

Managing the Maintenance Organization will be the subject for this panel discussion. Other phases to be presented at this session are: Selection, Indoctrination and Evaluation of Maintenance People; Communicating Information from Management to Maintenance Personnel and Vice Versa; Worker Motivation and Morale; and Getting Along with Unions.

Wednesday Evening, January 26
8:00-10:00 p.m.
Concurrent Roundtables at Palmer House

The first 10 roundtable discussions will be repeated at this session.

Can you identify yourself among the many plant engineers who attended the informal luncheon during last year's conference?

Luncheon Planned for American Institute of Plant Engineers

PLANT ENGINEERS' Societies of Chicago, Calumet Region and Northern Illinois will be hosts at the informal luncheon being planned for the members and guests of the American Institute of Plant Engineers.

Plant engineers who are interested in learning more about the AIPE or would like to have a plant engineers society formed in their home city are invited to attend and get acquainted with the groups which are now active.

This luncheon, which will be Dutch-treat, at about $4.25 per plate, will be held at the Saddle and Sirloin Club, Stock Yard Inn, International Amphitheatre, on Tuesday, January 25, at 12:30 p.m.

Since this is the one time in the year when so many plant engineers are gathered under one roof, this luncheon is an excellent opportunity for these men to get together for an informal social meeting.

If you plan to attend, will you kindly fill in the coupon appearing on this page and mail it to Ted Ramond, who is handling the reservations.

Mr. Ted Ramond, Plant Engineer
Goodman Manufacturing Co.
4834 South Halsted Street
Chicago, Illinois

I plan to attend the American Institute of Plant Engineers' luncheon to be held on Tuesday, January 25, at the Saddle and Sirloin Club of the Stock Yard Inn. Please make a reservation for me.

☐ **I am a member of the _____ Plant Engineers' Society.**

☐ **I am not a member of a plant engineers' society, but I would like to see one organized in my city of _____.**

Name _____ Company _____

Title _____ Company Address _____

WORK SIMPLIFICATION TRAINING—

How It Affects and Is Affected By Plant Engineering

Work simplification programs have, in many companies, eliminated resistance to change, increased the employee's productivity, improved methods, and improved employee morale . . . Later articles will show how these programs tie in with plant engineering and maintenance work

By LILLIAN STEMP, Special Technical Reporter

WORK SIMPLIFICATION training helps to create the kind of atmosphere in which personnel can enthusiastically develop and accept job improvements. This is important, because it is not always easy to put in work improvements even though they are practical and desirable. Sometimes there is resistance from the supervisor, sometimes from the worker. This resistance may be motivated by fear of loss of employment as the result of the work improvement. Often it is hurt pride, especially if the man on the job has not been asked for his ideas during the development of a project.

So much emphasis is placed on the human factor in work simplification training that resistance slowly disappears. When the Factory Management Division of Sears, Roebuck and Company recently made a survey of some of the companies who have work simplification programs, among the comments submitted along these lines were the following:

"An 8-hour course in work simplification at the employee level has in almost every case increased the individual's production and the program has performed miracles in connection with a change of attitude. Resistance to change has been noticeably reduced. This program, of course, gives the employee mainly the principles of work simplification, along with some motion economy."—Mitchell Thomas, Hardwick Mills, Cleveland, Tennessee.

"Our work simplification Conferences have had the following benefits: (1) breakdown of resistance to change; (2) development of a consciousness in division executives of the need for methods improvement; (3) substantial improvements in methods developed in the divisions and traceable to the training given; (a number of these improvements are being adopted nationally); (4) understanding of the principles and practices necessary to maintain good human relations."—McKesson & Robbins, Inc.

Two conditions that are necessary for the success of work simplification also lend most to the creation of an enthusiastic and co-operative atmosphere. The first is the support of top management for the program. Allan H. Mogensen, who has been training representatives in work simplification, promotes this support by conducting winter conferences for operating heads of companies, both large and small, whose time away from the office is limited.

Fig. 1. At Maytag, the work simplification program and employee idea plan are tied together. Payment of a maximum award was made to DeVerne Creede for an idea on reducing size of crate base lumber. Left to right: M. M. Knight, foreman of Mr. Creede's department; Fred L. Maytag II, President; Mr. Creede

Courses and Seminars

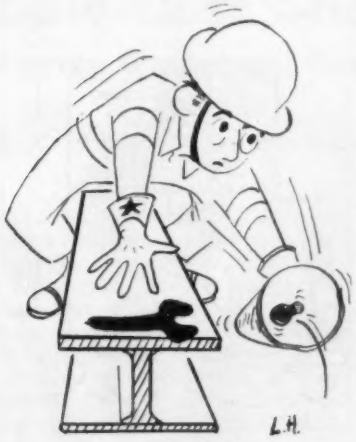
Instead of a six weeks' course as is given at Lake Placid, New York, the executive seminars last two weeks. Fundamentals and techniques of work simplification programs are reviewed. Mr. Mogensen has proven that work simplification programs are capable of increasing the productivity of workers by 50 per cent. This achievement is possible where management admits it does not know all of the answers and where it will give the workers a little help and considerable recognition. Management needs to convince the workers that work simplification will not work them out of their jobs.

The second condition is that the employees must be sold on the idea of work simplification. One of the ways this can be done is to assure them that improvements will make the work easier for them but in no instance will be the cause of their losing their jobs. When proper recognition for work simplification progress is given, uneasiness is not apt to develop. Many of the companies sponsoring such programs keep their organizations informed of the progress through special bulletins and reports. Recognition is sometimes given through cash awards for proposals accepted and installed. Sometimes certificates are presented by top executives at company-sponsored luncheons or dinners.

Recognition for Employees

An example of recognition and confidence occurred when a company faced a problem of an operation which was particularly unpleasant and tiresome to the workers. An outside expert tried to sell himself on tackling the problem. But the operating executive said, "No, not until we give our work-simplification-trained people a chance first." Several employees formed a team and as such solved the problem and also had the opportunity of upholding the confidence management had placed in their abilities.

The Lowe Brothers Company (paint products manufacturers of Dayton, Ohio) have appointed Problem Solving Units to tackle work simplification projects. Department foreman and selected employees work as a team. One of the first projects such a team completed was to develop a new and improved method of handling and storing shading pastes. They report that "Under the old method, when shading pastes were needed for production, it was necessary for employees to remove and discard the skin or film from the paste drum in storage. What's more, paste drums were not clearly marked.



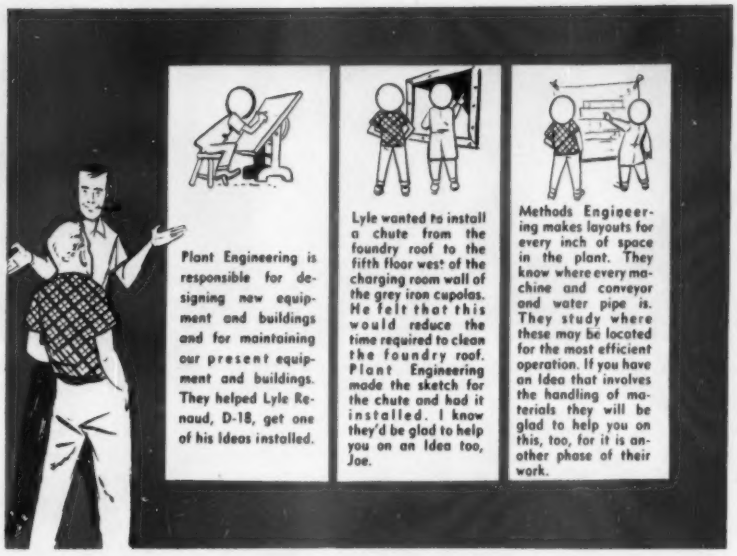

Plant Engineering is responsible for designing new equipment and buildings and for maintaining our present equipment and buildings. They helped Lyle Renaud, D-18, get one of his ideas installed.
Lyle wanted to install a chute from the foundry roof to the fifth floor west of the charging room wall of the grey iron cupolas. He felt that this would reduce the time required to clean the foundry roof. Plant Engineering made the sketch for the chute and had it installed. I know they'd be glad to help you on an idea too, Joe.
Methods Engineering makes layouts for every inch of space in the plant. They know where every machine and conveyor and water pipe is. They study where these may be located for the most efficient operation. If you have an idea that involves the handling of materials they will be glad to help you on this, too, for it is another phase of their work.

Fig. 2. This sheet from Maytag Plan booklet shows employee how plant engineering department ties in with program by rendering technical assistance

thus necessitating extra time for locating the required color for shading. Applying the fundamentals of work simplification, the filling department group numbered each shading paste drum for easier identification and location. The next step was to eliminate the waste of 'skin' from the shading containers. The group solved this problem by putting an 'anti-skinning' agent atop the paste in the container."

Company Solves Own Problem

Last November, the *New York Times* saluted 60 Chesapeake and Ohio Railway workers who, through work simplification, tackled a project of converting the C & O's steam-engine shop into a Diesel-engine repair plant. Management engineers said it might take three years for the conversion. The C & O workers did the job in six weeks.

When the Cleveland Electric Illuminating Company considered methods for an organized cost reduction program, they decided on one that would give their employees a chance to suggest ideas. They abandoned the idea of hiring a firm of management consultants to study operations and recommend improvements because it would take too long to produce real results, it would be too costly and it would cause employee resentment. The work simplification program was decided upon because it could be carried on by company personnel, results would show up sooner, morale would increase because individuals would be improving their own jobs and getting credit for doing so.

Since the decision was made, the results have been outstanding. Thousands of proposals have been received. Here are a few examples:

1. A tool box on wheels containing a variety of necessary tools for different jobs is now being used by maintenance men. This eliminates frequent trips to and from the tool locker as the men move from job to job.

2. A large bank of storage batteries is presently being maintained at the Miles Meter Laboratory for the testing of d-c instruments. Substitution of an especially designed electronic d-c power supply, which operates from a three-phase source has reduced maintenance costs, floor space, and has eliminated the purchase of a replacement battery.

3. Rubber guards have been installed over the spark plugs on all portable pumps to prevent them from getting

About The Author

Lillian Stemp, member of the Western Society of Engineers and American Society of Safety Engineers, has had 22 years of industrial experience and is the author of several safety and maintenance books and manuals. She is a vice-chairman of the Printing and Publishing Section, National Safety Council, and also serves on an American Standards Association committee. Miss Stemp was the winner of the 1953 cash award for the best paper submitted to the Western Society of Engineers.

Fig. 3. Waste resulted, as shown by dried portions on side of this drum, from old method of skinning, shading paste

Fig. 4. Work simplification team at Lowe Brothers numbered drums for identification; added anti-skinning agent

wet. This insures quick starting at all times.

4. When a cast-iron economizer tube splits, it is now plugged with two-inch pipe of the same length. The economizer is then used until enough tubes have been plugged to warrant replacement of all damaged tubes at one time. Formerly each split tube had to be individually removed by breaking it with a sledge hammer. This method permitted possible damage to the header.

5. Purchasing clamping material in bulk instead of assembled units has made it possible to assemble the strap and clamps for pipe leaks in any desired length or width. These are then locked in place on the pipe by using a clamping machine. Formerly, clamps were made of heavy strap steel, drilled, and then belted together around the leaky pipe.

When an employee is given an opportunity to study his own job and is given such aids as the flow process chart, the multiple activity chart, and the operator chart, his ideas for improvement take definite and practical form.

The Maytag Company, of Newton, Iowa, has gone a step farther by furnishing employees with the services of a gadget shop. If an employee believes a gadget will help put his idea across, he contacts the work simplification unit and arrangements are made to build the gadget. In explaining the shop to its personnel, Maytag reported that "Gadgets are working models of ideas and are used to determine whether the proposal is practical for installation in a production department of the Maytag factories. If the idea is sound and workable in the gadget shop, production equipment is then designed and built."

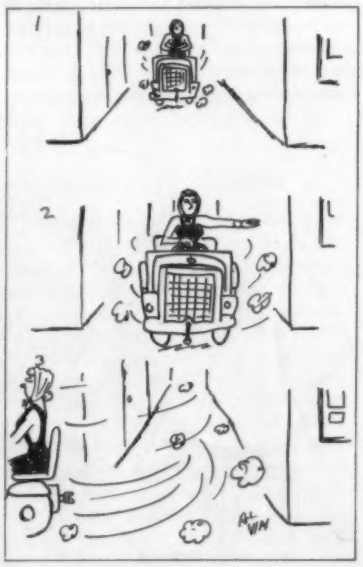
Typical Training Program

Engineering departments which are already established in a company are in an excellent position to promote work simplification programs. Departments get the help of dozens of on-the-job experts, while at the same time, they can speed the completion of work simplification proposals because they can provide technical assistance. By applying work simplification principles to a job, improvements can result in safety, maintenance, layout, work procedures, work methods, tools and processes and working conditions.

Typical subjects covered in work simplification training classes at a plant include: Work Simplification and You; Work Simplification and Steady Employment; Work Simplification and Measurement; and Analyzing the Method for Improvement.

At the small Newark, N. J. pigments plant of the du Pont Company, the work simplification program has operated without a change ever since it was established in 1937. Over the years, they encountered periods when the number of work simplification proposals began to lag. As soon as such a trend became noticeable, a stimulation program was started. Such a program might consist of a variety of approaches. For example, a number of current plant problems might be publicized together with the importance of each problem and some possible solutions. The performance of various departments might be publicized to arouse competition. The department head might discuss the performance with his group and again point to the ever present operating problems which require attention.

Fig. 5. Allan H. Mogensen, standing, has been conducting work simplification conferences at Lake Placid since 1937. Last fall the first attempt was made to try industry-wide approach to subject and effort met with outstanding success



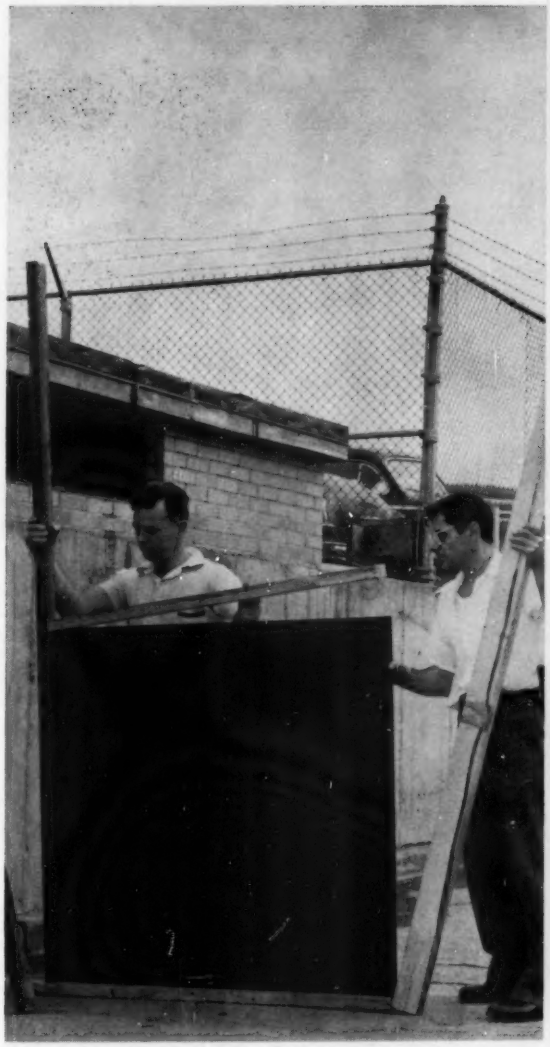


Fig. 1. Demonstration of first step in erection of partition. Tenoned and rabbetted stile is put in place without nails

Fig. 2. Another piece of Masonite is slid into place and top plate inserted. Carpenter Supervisor Brutschy is at right

Low-Cost Shop Partitions—

Sperry Gyroscope Cuts Material, Erection, Storage Costs

By D. M. SAUERMAN, Planning Supervisor, Sperry Gyroscope Co.

LIKE MANY LARGE industrial organizations, the Sperry Gyroscope Company at Great Neck, Long Island, requires considerable quantities of portable, economical partitions to segregate areas where confidential or secret projects are located.

Panels with standard 2 in. by 4 in. framing, covered with Masonite, Sheetrock, or plywood were found to be fairly expensive to fabricate, bulky to store, troublesome to move, and required a considerable amount of valuable floor space. Light and dust penetration were also problems in many installations.

These facts were continually drawn to the attention of the author. So, with the assistance of John Brutschy, foreman of the Carpenter Shop, a solution was sought. What type of partition would answer every problem? Economy, rapid erection, quick dismantling, easy storage, minimum floor space—all were considered.

The answer was found in a light, pre-fabricated partition with standard sections designed in modular lengths which can be shop-fabricated, easily handled, and rapidly installed, re-

Fig. 3. Installed partition in Sperry Gyroscope plant shows how interlocking sections of partition present uniform appearance

moved, and re-erected, without damage to parts. The partition is attractive in appearance, sturdy, and can be stored in a fraction of the area of panel type material.

For framing, it was decided to use standard 2 in. by 3 in. material in red fir, including intermediate studs, base plates, center and top stiles. This material finishes to 1⅝ in. by 2⅝ in. Intermediate panels are made from ⅛ in. standard Duolux Masonite, which is smooth on both sides.

To start a run of partition, a 3 in. by 4 in. upright is anchored to the floor and ceiling. Standard joints are provided at the 9 ft height, to keep the length down to half of an 18 ft piece.

Erection Details

The stud is mortised at three points, and a rabbetted groove, to receive the Masonite, extends the full length. Next, two pieces of 2 in. by 3 in. by 6 ft base plate, mortised at the 4 ft and 9 ft joints, are fastened to the floor. A piece of 47 in. by 47 in. Duolux board is slid into the base and stud grooves. A 4 ft stile of 2 in. by 3 in. material, tenoned at each end, and rabbetted top and bottom, slides over the Duolux board and fits into the stud mortise. Another piece of Duolux board is slid into place, after which the top plate is inserted. An intermediate 8 ft stud, with bottom tenon, mortised at 4 ft and 8 ft is fitted into place. When three 4 ft sections have been assembled, another 3 in. by 4 in. ceiling-high stud is erected, and a 1 in. by 4 in. cap is screwed into place to stiffen the assembly. Twelve-inch mending plates are screwed to the 3 in. by 4 in. studs and base plates as stiffening members.

Up Quick, Down Quick!

Time studies were made to determine the speed of erection and dismantling. Two men erected 12 ft of partition in less than thirty minutes. They dismantled it in less than fifteen minutes. The over-all cost of fabrication and erection, unpainted, is just under $3.50 per foot. With parts sprayed prior to erection, the cost per lineal foot is just under $5.00. This compares very favorably with any previous partitions fabricated for installation in the Sperry Organization.

Economy is gained through the use of modular lengths of material. Sections are used in 4 ft, 6 ft, 8 ft and 9 ft lengths. Masonite is used in 4 ft by 4 ft or 4 ft by 3 ft pieces, cut from standard 6 or 8 ft panels. All fabrication is done on a production run basis in the shop, from jigs and templates. When dismantled, a large quantity of partition can be stored in a few square feet. Parts are interchangeable, and all material is light enough to be handled by one man, although two are required for erection and dismantling.

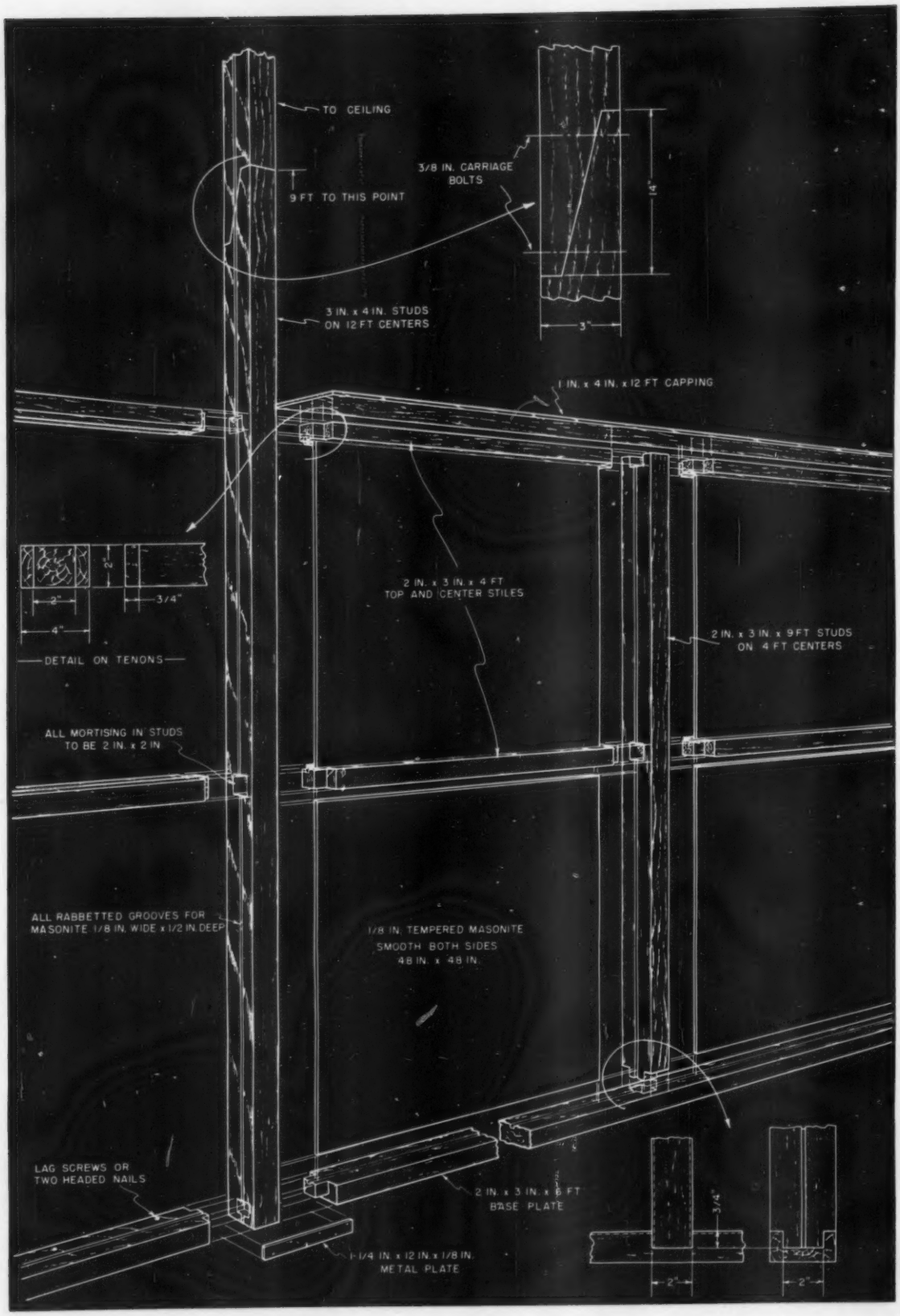
No nails are required for the erection of the partition—the 3 in. by 4 in. studs are bolted together at the joint. Lag screws or two-headed nails fasten the base to the floor. Wood screws hold the mending plates and the 1 in. by 4 in. capping. Every piece can be used many times. The following parts are standard:

- 3 in. by 4 in. by 9 ft studs at 12 ft intervals
- 2 in. by 3 in. by 8 ft studs at 4 ft intervals
- 4 ft by 4 ft by ⅛ in. standard Duolux Masonite panels
- 2 in. by 3 in. by 4 ft center and top stiles
- 2 in. by 3 in. by 6 ft base plates
- 1 in. by 4 in. by 12 ft capping

plus lag screws, bolts, wood screws, two-headed nails, and mending plates.

Installations completed to date indicate that the new partition successfully answers the problems which were posed before its conception, and the management feels that this innovation will play its part in the over-all program of cost reduction.

Fig. 4. Drawing at right presents details of construction of Sperry partition


TO CEILING
9 FT TO THIS POINT
3/8 IN. CARRIAGE BOLTS
3 IN. x 4 IN. STUDS ON 12 FT CENTERS
1 IN. x 4 IN. x 12 FT CAPPING
2 IN. x 3 IN. x 4 FT TOP AND CENTER STILES
2 IN. x 3 IN. x 9 FT STUDS ON 4 FT CENTERS
2"
3/4"
4"
DETAIL ON TENONS
ALL MORTISING IN STUDS TO BE 2 IN. x 2 IN
ALL RABBETTED GROOVES FOR MASONITE 1/8 IN. WIDE x 1/2 IN. DEEP
1/8 IN. TEMPERED MASONITE SMOOTH BOTH SIDES 48 IN. x 48 IN.
LAG SCREWS OR TWO HEADED NAILS
2 IN. x 3 IN. x 8 FT BASE PLATE
1 1/4 IN. x 12 IN. x 1/8 IN. METAL PLATE
3/4"
2"
2"

Corroded Pipe Trouble?

Try Mending It With Glass Cloth and Resin

BEFORE This is how the pipe at the Bishop plant looked before it was coated with two plies of glass cloth, thoroughly saturated with resin. There were large holes in some areas and other sections rusted paper thin

AFTER Here is how it looks after the scale was knocked off and the glass cloth and resin applied. Leaks were then plugged and two additional coatings wrapped about the pipe. Section can now support weight of a man

REPAIRING industrial piping and other plant equipment can be a simple, easy task. And the only tools needed are glass cloth and polyester resin.

The recent repair of a water header at the Bishop, Texas, plant of Celanese Corp. of America, is just one example of how plant equipment can be put back into service in a short period of time.

Approximately 40 lineal feet of header pipe at this plant had corroded. There were large holes in some areas and the balance of the pipe was rusted almost paper thin. Twenty holes were below the water level of the pipe, which normally runs half full.

Repair Procedure

The repair procedure used was as simple as it was effective. First, scale was knocked off and two plies of glass cloth, saturated with a self-curing blend of Celanese MR-28C resin, were applied over the large holes. Leaks were then plugged and two additional plies of glass cloth, saturated with the resin, were wrapped about the entire rusted area of the pipe one at a time.

Just 30 gal of resin were required and total material costs amounted to only $137.88. It was, of course, unnecessary to remove the multiple connections or the pipe itself. Thus, many costly man-hours, that would normally be required if the section were replaced, were saved.

The reinforced polyester laminate has ample strength to carry the weight of a man standing over the completely rusted-through section of the header. The laminate will not rust or rot and its moisture absorption is less than half of one per cent.

Experience indicates that long, trouble-free service can be expected. But in the event that accidental rupture occurs, it is only necessary to apply additional laminate to the damaged area.

Additional Information

If you would like additional information about this product, either write The Editor, Plant Engineering, 110 South Dearborn St., Chicago 3, Illinois, or indicate "Celanese MR-28C Resin" on the bottom of the postage-paid cards elsewhere in this issue.

Fig. 1. Sub-purlins of roof are here welded to building purlins

Fig. 2. Simple, slide-on clips anchor panels to sub-purlins

Fig. 3. Easily-handled panels are simply dropped in place

Fig. 4. Surface, Perlite in this case, is given smooth finish

New Structural Roof System

Rapid Erection, High Rigidity, Attractive Appearance

AMERICA'S FIRST application of the Ingersoll Roof Deck, for use in combination with any built-up roofing material, was announced recently. This new structural roof system combines strength, adaptability and low maintenance, it is reported. It is manufactured by Reflectal Corporation, Chicago.

The design consists of a full-floating panel system securely anchored to a "grid" of sub-purlins. The result, despite full freedom for expansion and contraction of panels, has extremely high strength with 8 ft spans according to Pittsburgh Testing Laboratory.

Sub-purlins used in the roof deck are galvanized cold-rolled steel. They are accurately aligned on 2 ft centers by means of a light jig; they are then welded to the structural purlins. The corrugated panels, about 2 ft by 3 ft in size, are then dropped in place between the sub-purlins and are secured by means of slide-on clips as shown in Fig. 2, above.

The manufacturer points out that accessory accommodation is ideal, with no cutting of panels required. This new decking satisfies the most stringent building codes, it is pointed out, and also meets the uplift requirements of the F.I.A.

It is said to be the first deck offered in porcelain, aluminum and galvanized steel. It needs no field painting, no maintenance painting. The inherent reflective qualities of the materials enable the deck to reduce summer heat.

Another advantage, in installations where a wet roof such as Perlite is used, is to facilitate drying and obviate blistering of roof in hot weather by creating in the roof a natural breathing system.

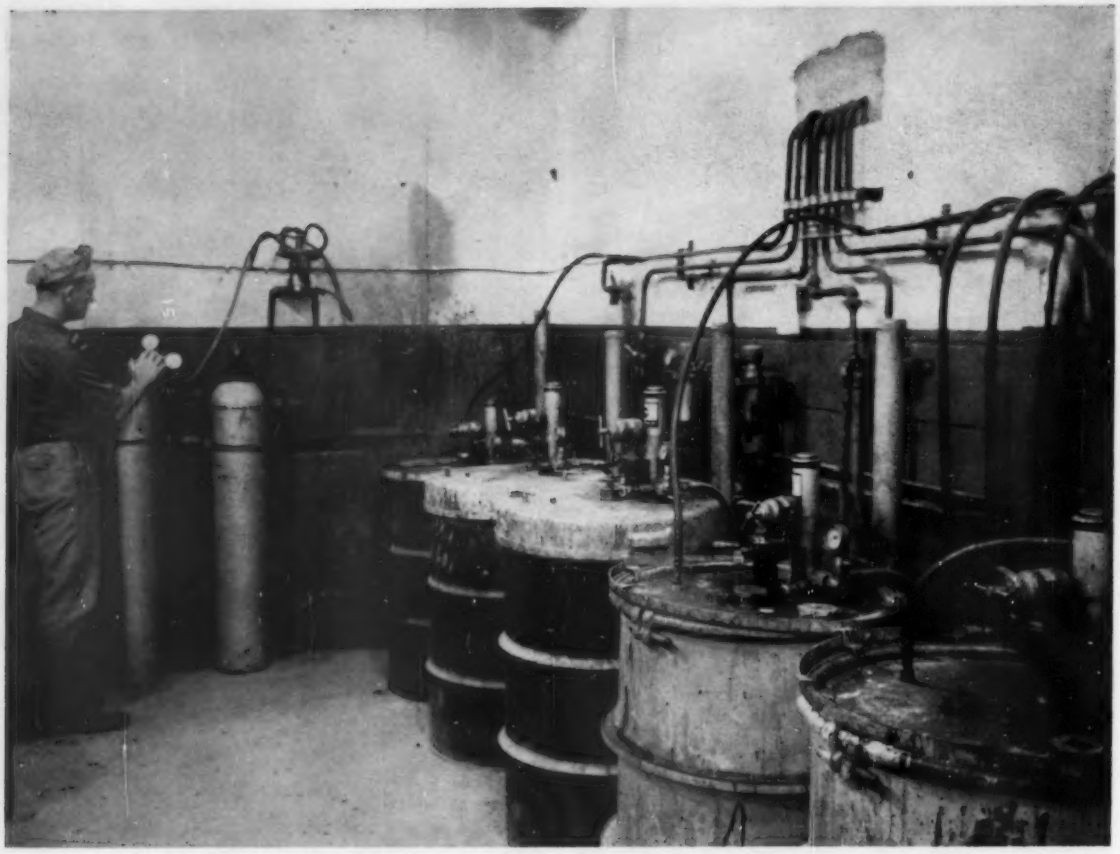


Fig. 1. This is how one of the first installations of the system looked. It works only on paints that dry by oxidation

No Clot, No Gel, No Skin— Inert Gas Also Keeps Paint Thin

This recently developed idea has done away with clogged piping in paint spray systems at Westinghouse . . . Better yet, the paints' stable viscosity permits trouble-free application of uniform finishes to product . . . Refinishing reduced to minimum

By B. V. McBRIDE, Materials Engineering Department, Westinghouse Electric Corporation

WHEN PAINT SPRAY booths draw air-drying paints from a central reservoir, the paint surface often oxidizes within the reservoir. This causes skinning and gelling that can clog the piping system sufficiently to halt production. More serious still, accumulative increase in viscosity prevents the application of uniform finishes to the product.

The Materials Engineering Department of Westinghouse, faced with this problem, recently devised a method for providing an inert atmosphere of carbon dioxide to protect the paint surface. A test installation proved successful, and the technique is now in use on a production basis.*

Skinning and gelling will occur only when air is in contact with the paint surface or is entrained as bubbles or dissolved air. However, oxidation occurs throughout the entire paint mass since it is in a state of continual agitation and flow. The paint skins and gelled paint particles which result are not confined to the supply containers. Eventually the strainers installed to protect spray equipment are clogged and cleaning becomes necessary.

This condition ordinarily exists only

*This system is applicable only on paints that dry by oxidation. There is no particular merit to the system where non-oxidation type air-drying paints, such as bituminous or cellulose lacquers, are used.

to a minor degree when paint consumption is high enough to require daily refilling of the emptied containers. But at times of low or intermittent production, skinning and gelling and increased viscosity present substantial problems.

Although containers are kept tightly covered so that a layer of solvent vapor sheathes the paint surface, this precaution is inadequate when the level of paint falls and air is drawn into the container. Anti-oxidizing agents provide no practical solution since their use results in an unacceptable increase in drying time. Likewise, the use of supply containers just large enough for short-time operation is unsatisfactory because an ample supply of paint is then not available in periods of high production activity.

Tests With Inert Gas

After initial study, engineers arranged a test installation to check the feasibility of using an inert atmosphere to control oxidation. A container, partially filled with a paint susceptible to skinning and gelling, was equipped with an inlet for carbon dioxide. After normal atmosphere had been displaced by the CO_2, the container was covered tightly while the paint was stirred and circulated for five days. During the test a small amount of CO_2 was introduced intermittently to flush out any air that might have penetrated the container.

At the end of two days, no measurable change in viscosity had occurred, and no skinning and gelling was detectable. Ordinarily, viscosity would have exceeded the allowable maximum within 24 hours, and skinning and gelling would have been severe. At the end of five days, viscosity had increased to a value just under the allowable maximum, but there was no indication of skinning and gelling.

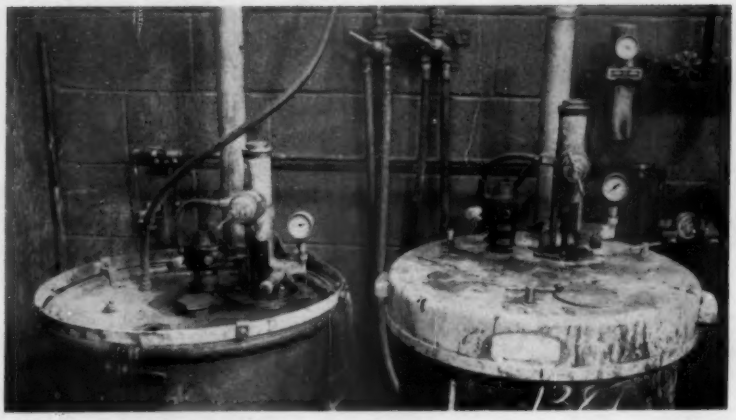


Fig. 2. Closeup view of paint drums. Inert-gas hose is shown entering top of drum

The decision to utilize inert atmosphere on a production basis was made after this test. In final operation, paint containers are fitted with tight gasketed covers and connected to a tank of CO_2 through copper tubing. Flow and pressure are controlled by the pressure reducing valve on the CO_2 cylinder and by a gas pressure regulator in the supply line. A manometer measures gas pressure in one of the paint containers. A schematic diagram of the arrangement is presented as Figure 1.

The system was placed in operation by opening the bungs in the container cover before CO_2 was admitted to displace the atmosphere. Afterward, the bungs were replaced and pressure controls were adjusted to maintain a gas pressure of one ounce per square inch. Once in operation there is no need to remove the covers except to service the pumping and stirring mechanisms. Refilling with paint is done through the bung openings.

In the daily operation of four 50 gal containers, one 50 lb tank of CO_2 is used each week. Material cost is approximately $1.00 per container each week. The loss of CO_2 is produced mainly by the flushing of containers and by the displacement of the gas when the containers are refilled with paint.

Maintenance costs are very low, and are chiefly those of maintaining gas supply. The high maintenance costs customary before the installation have been greatly reduced, while the costs of defective materials and production shut-downs have been eliminated altogether. Of great importance is high uniformity in quality of the final finish.

Fig. 3. Diagrammatic sketch of inert-gas system as installed in photograph on opposite page. Maintenance costs are low

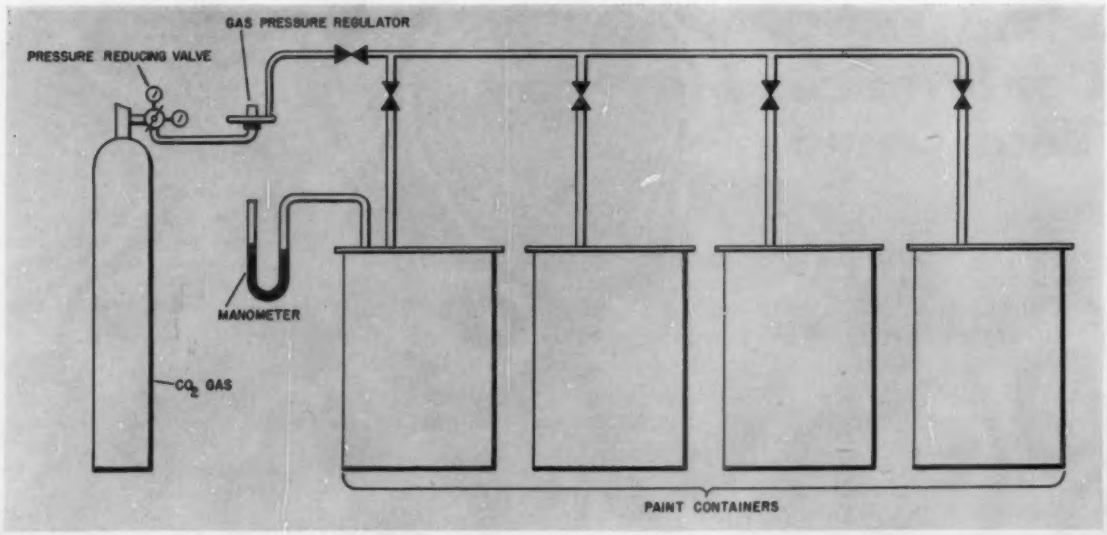


Fig. 1. Partial view of the meeting with N. M. Lucas of the Winston-Salem plant detailing a new type storage rack for infrequently used records. More than 50 men from plant engineering departments of Company plants attended the conference

Plant Engineering Conferences May Pay Your Company

Do intra-plant conferences of plant engineering personnel pay dividends? . . . Based on its annual Plant Engineering Conference, Western Electric Company answers with an emphatic "yes!" . . . However, it cannot be assumed that conference success is result of an accident of circumstances . . . In this conference each step is carefully planned and revised every year to guarantee success

By S. S. SHERRILL, Asst. Supt., Factory Planning and Plant Engineering, North Carolina Wks., Western Electric Co.

GROWING decentralization of industry has pointed up a real need for more and better communications between plants and divisions of a company. Those functionally responsible for a general classification of work should be cognizant of what is being accomplished by those similarly engaged at other locations.

As an adjunct to normal communication channels, the Western Electric Company, manufacturing unit of the Bell Telephone System, has made good use of round-table conferences for many years. Intra-plant conferences in Western Electric date back to the late 30's when Tool Engineering, Machine Design, and Quality Control conferences were initiated. Interrupted by the war years, the annual meetings were revived and expanded because of their proven worth. A Plant Engineering Conference was

started in 1949 and the Company is now planning a Machine Tool Conference to collate new methods and applications in this field.

Western Electric's sixth annual Plant Engineering Conference was held recently (November 16, 17, 18) at the North Carolina Works of the Company at Winston-Salem, North Carolina. Representatives of its fourteen major manufacturing locations, four subsidiary and related organizations, and various New York Headquarters functions attended. The number from each location varied from one to five persons from both engineering and supervisory levels.

Total attendance was about fifty invited men with local engineeers attending where practical. Personnel attending these meetings are rotated from year to year to gain a maximum interchange of ideas. Location of the conference also varies each year with a major manufacturing location serving as host. This, too, is invaluable as it offers an opportunity for the development of consisent operation of similar organizations on a Company-wide basis.

Split into three sections, the Plant Engineering Conference covers three general subjects—Materials Handling, Factory Planning, and Plant Engineering. Each section was allocated about six hours for discussion with some overlapping on a day-to-day basis due to a tour of the local plant.

The Materials Handling Section covered such subjects as: trucks, both hand and electric types; pallets; conveyors; general handling, storage methods and facilities; and packaging. A good portion of this session was spent in reviewing Western Electric standards for electric trucks, particularly as to safety equipment to be incorporated into purchase specifications.

Pallets, too, received wide attention not only for internal Company use but as recommendations to be forwarded to the Committee for Pallet Standardization of the American Standards Association. J. E. Wiltrakis of Western Electric's Kearney Works, New Jersey, is Technical Chairman of this ASA committee which has been set up to standardize pallet sizes throughout industry.

Incidentally, Mr. Wiltrakis and his committee would appreciate being informed of any industrial experience with pallets, particularly as to definition, survey of uses, sizes, materials, and testing methods.

The session was not limited to Western Electric methods but also went into a discusison of experiences with commercially available materials handling devices.

An interesting paper also delivered during this section of the conference was prepared by R. J. Houdak of the Chicago Works of the Company and evaluated the recently initiated Purdue University packaging course. The paper described the curriculum for the four-week seminar and recommended its use where circumstances permit.

The time allotted for this section was from 8:30 a.m. to 3:30 p.m. of the first day. From then until 5:30, the Factory Planning Section was started and carried over to the second day of the meeting which left time in the morning for the group to look over Western Electric's new manufacturing plant at Winston-Salem which is rapidly nearing completion.

Factory Planning as defined and practiced in the Western Electric Company is plant engineering of manufacturing and service facilities. Subjects in this category discussed at the meeting included: shop benches, racks, and partitions; cafeteria planning; noise reduction; floor layout; factory installations; and allied subjects.

Highlights of this section included a general discussion of rectifiers for use in electro-plating and electrical specifications for factory installations which would be acceptable to all locations.

Final day of the meeting was devoted to plant engineering and the subjects ranged from plastic pipe as buried conduit to high pressure boiler installations. Also touched on were incinerator design, radiator trap maintenance, experience with outdoor paints, maintenance of wood floors, air conditioning, high voltage lighting systems, fire protection equipment, etc.

The conference is designed as a work conference. There is no planned entertainment although a dinner is given by the "host" location. This dinner is also attended by many of the local management staff and serves as a means of broadening acquaintanceships within the Company. Facilities (smaller conference rooms) are

Fig. 2. One of the points of interest in host plant was this two-tiered room

Fig. 3. Here, some of the attendees are inspecting a new truck, one of the first delivered incorporating Company specs

also made available to those conferees who want to "talk shop" after the daily meeting.

Like most of the Western Electric conferences, Plant Engineering is set up under a general chairman from the "host" location to serve for one year. To assist the general chairman, three sub-chairmen, one for each section of the conference (i. e. Materials Handling, Factory Planning, and Plant Engineering) are chosen to organize the particular section. These selections of sub-chairmen are announced at the conference preceding that to which they are assigned so that they may benefit from prior experience through personal contact with the outgoing sub-chairmen.

Until two years ago, papers about specific subjects were introduced and discussed in open meetings. But considering both the broadening field and the interest generated this was thought too time consuming. It was then decided by the conference that all papers be prepared several months in advance and distributed to all concerned prior to the actual conference.

It works this way: A list of subjects for each section is drawn up by the responsible sub-chairman; each plant is requested to have a paper prepared on their methods and experiences in dealing with all subjects with which they might be familiar; these papers and reports are then distributed to an individual at each location who passes them on to the other conference attendees.

Binders are furnished to the attendees and the papers are read and inserted as they are received. All papers are submitted on a form with special indexing to facilitate both filing and future reference. A general style instruction is also followed in preparing the papers. Comments are invited on all papers and these comments are all distributed in the same way as the original paper, also well in advance of the conference itself. An important factor, not readily recognized, in distributing the papers in this manner, is that interest in the conference is maintained on a year-round basis.

Advance Planning

In advance of the meeting, each sub-chairman allots a definite conference time limit for oral discussion of each subject based on interest shown (by comments on the original paper). At the actual meeting this schedule must be adhered to or varied only at the Chairman's discretion.

This method has proven very effective—considerably more subjects are covered, more details are offered, the attendees find the information easier to absorb, and extraneous and repetitious comments are eliminated.

Experience has shown that it is well to start work on next year's conference even before this year's is completed. Each step must be carefully planned to assure a well-rounded smooth running conference that benefits all participants. Future subjects must be lined up and distributed in order to give each location sufficient time to collate information and prepare papers and whatever illustrative material may be necessary.

Following is an approximate schedule which was followed by this year's General Chairman in preparing and completing plans for the Conference. About February 1 he met with the General Chairman of the previous conference for consultation in organizing the coming meeting. The new Chairman then requested each plant to furnish a list of subjects they would like to have discussed or on which they would be willing to prepare papers.

During the month of March the General Chairman met with his sub-chairmen and on the basis of the information received from the plants, a proposed agenda was set up for the three sections, and subjects assigned to various locations. In addition to the assigned papers the various plants were informed they could submit any papers of an informative nature, and, if time permitted, the Sub-chairman would pick out several of these papers for general discussion.

At the same time that the plants submitted subject items, notification was also given of the number of copies of all papers required by their location for technical staffs and libraries and the name of the person to receive them for distribution to these organizations. All papers are mailed directly from the originating location to the

(Continued on page 158)

Improving Lighting Maintenance

Twice as much work done, in the same time, at a higher factor of safety, has resulted from the use of special maintenance tools

By **PAUL LINDHOLM**, Department Chief Plant Engineering, Western Elec. Co.

Detergent solution in tank at left is used first. This is followed by dip in rinse water at right. Work is done in batches of twelve

TWO-MAN TEAMS, with twelve extra fluorescent light fixtures at their disposal, are handling our Kearny plant fixture cleaning program.

Two portable units serve as the basic tools the men need to clean the many fixtures in the plant. One, a two compartment wash-rinse tank, constructed of angle iron framing with sheet metal panels, has one compartment for detergent solution and another for rinse water. It is fitted with a hinged cover to prevent spillage during transit.

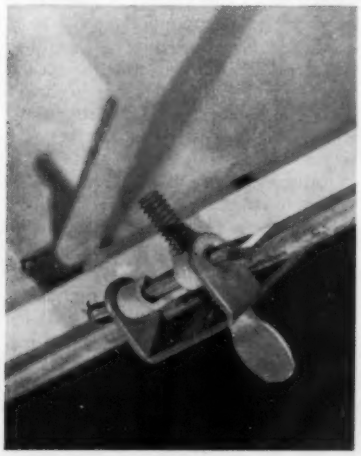
The other tool, a 12-compartment rack of wooden construction, stores twelve light fixtures, standing on end in the rack. Both the tank and the rack are mounted on pallet bases, for easy transport by lift truck.

The cleaning method is intended to minimize the time spent by the cleaners on top of ladders, particularly in areas not suitably reached by other means, since cleaning light reflectors while balanced on top of a ladder was unsatisfactory and is clearly recognized as an unsafe practice.

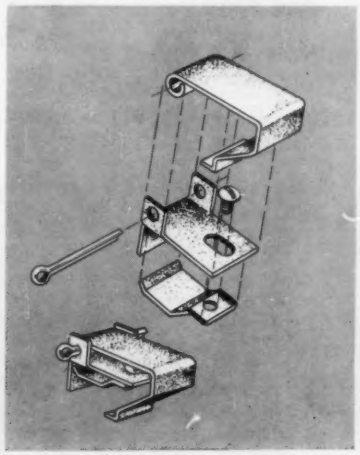
When a location is scheduled for lamp cleaning, the two pallets are moved to the area. As each lighting fixture is removed from its location, a clean one from the storage rack is installed in its place. When twelve dirty fixtures are in the rack, the washing process begins. The fixtures are dipped, wiped clean and rinsed.

Gravity-type latches, designed by the author, have proven valuable in the operation. Replacing three screw clamps, each with ½ in. of thread to turn when a reflector louver was removed or released, these clamps have been an important time-saving factor. A simple outward flip of the catch releases it, freeing the louver section for removal and an upward push on the louver reinstalls it.

This is the old screw-on type of louver clamp with ½ in. of thread which considerably slowed up louver removal



Details of the gravity latch are shown in the drawing below. Simple flip of the catch releases it and louver drops



This is the new gravity-type latch developed by Mr. Lindholm. It is one of the important time-savers at Kearny

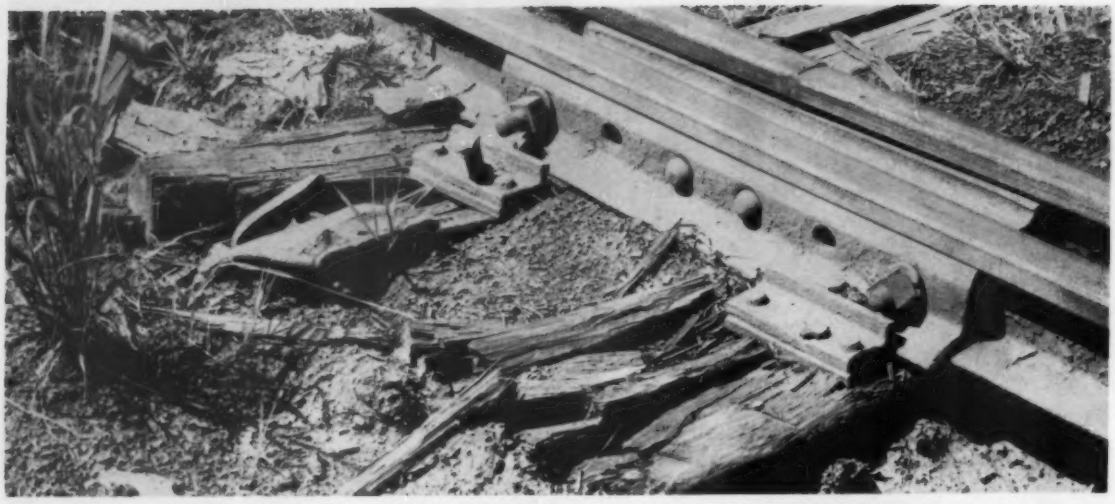


Fig. 1. Close-up of switch heel block. General deterioration of ties, loose and missing bolts endanger entire track operation

INDUSTRIAL RAILROAD TRACKAGE
IV—Switch Material, Accessories and Tools

This fourth article on maintenance of plant track systems discusses: Switches and accessories . . . Switch stands . . . Frogs and guard rails . . . Turnouts—maintenance and repair . . . And miscellaneous track accessories and tools

By E. J. SHELLABY, Vice President, L. B. Foster Co.

PREVIOUS ARTICLES in this series have reviewed track structure components of "running" rail lines. An important phase of track work is rail switching, turning and crossing. This article will cover switches, frogs, guard rails as well as miscellaneous track accessories that complete the track picture.

The split switch is the most widely used means of diverting rolling stock from one track to another. It consists of a pair of rails, known as the right hand and left hand points: one or more rods to hold the switch rails in proper position with respect to each other and to prevent "rising"; gage and switch plates to elevate the switch rails or points to required height in relation to the "parent" or "stock" rail; and auxiliary devices for securing, adjusting or protecting the several parts of the structure. Switch rails or points are made of standard rails of the same section and weight as the track for which they are used.

The frog is a device used at the intersection of two rails to permit the flanges of wheels moving along one of them to pass across the other. It provides continuous channels for the wheel flanges and supports the wheels over the intersection. The name "frog" is probably derived from its similarity in shape to a spread-eagled frog, roughly two "V's" butted together.

Filling rail, either straight or curved, provides the connecting link from the switch rail to the frog.

The complete arrangement by which rolling stock is diverted from one track to another is termed a turnout. The basic components are a switch, filling rail and frog together with various auxiliary parts. A turnout permits rolling stock to veer smoothly to the left or right and move from one track to a parallel adjacent track. A frequent error in ordering track equipment is the confusion between switch and turnout; a switch is only one component of a turnout.

The ends of each switch rail are shaped differently and have special designations. At the fixed or "heel" end, the switch rail has a full cross-section; at the moving or "point" end (that is, the end where the rolling stock moves from the running to the switch rail) the switch is literally a point. The rail is side-planed to a width of ⅛ in., and the final point is ground to a sharp edge. The base and a section of the switch rail head are planed and tapered so that the wheel can move smoothly from the running to the switch rail.

Railroad nomenclature is somewhat confusing insofar as the word "point" is concerned. Each of the two switch rails is termed a point. The pointed end of each switch rail is also termed a point. For the purposes of clarity, "switch point" or "point" will be used here only to designate the pointed end of the switch rail.

For the proper functioning of the switch as a part of the track structure, it is important to maintain correct

About the Author

E. J. Shellaby, vice president of the L. B. Foster Co., has been in the steel rails and track accessories business, particularly with industrial users, for 34 years. He is also the sales manager of the company's Pittsburgh office.

positioning of the switch rails relative to each other. This is accomplished by means of switch rods or bars connected to the switch rails through clips or lugs. They are available in various styles, either rigid or adjustable for use with side jaw clips or eccentric adjustable clips.

The switch rod placed near the switch points is known as the head or No. 1 rod and is long enough to go beneath both running rails, thereby acting as a hold-down for the switch rails. The rods after the head rod are known as the back rods or No. 2 rod, No. 3 rod, etc.

Switches and Switch Stands

Rail braces, fabricated from ¼-in. or ⅜-in. thick steel are often used to aid in holding the running track to gage along the switch length. The movement of rolling stock from the running to the switch rail can result in a lateral thrust tending to distort the running rail gage.

Switch plates are used to maintain proper elevation of switch rails and to present a smooth surface on which they may move right or left. For that reason they are commonly known as slide plates. Combination slide plates and fitting rail braces are also available.

Gage plates, sometimes used for switches subject to heavy traffic, relieve spike shear and wear on ties. They are positioned on the tie under the switch point, or in some cases on the first tie ahead of the switch points.

When warranted by heavy traffic, a device known as a heel block is used to maintain the heel end of the switch rail in perfect alignment horizontally and vertically with the running rail. Another device known as a switch point protector can be used to prevent excessive wear at the switch point. Placed directly ahead of the switch point, the protector absorbs the impact of passing wheels and the service life of the switch rail is greatly increased.

Switch Point Protector

Where severe service is encountered, the switch point is cut away for a substantial distance and replaced with a section of manganese steel bolted in place. This insert provides tough, long wearing material and materially extends the life of the switch rail.

A switch stand is a device whereby a switch is thrown, locked and its position indicated to those responsible for the movement of rolling stock. Although there is no standard design for this device (as there are for rails, ties, etc.) equipment manufacturers working with users have developed a number of switch stand models simple to operate and maintain, positive in action and hazard-free to the operator.

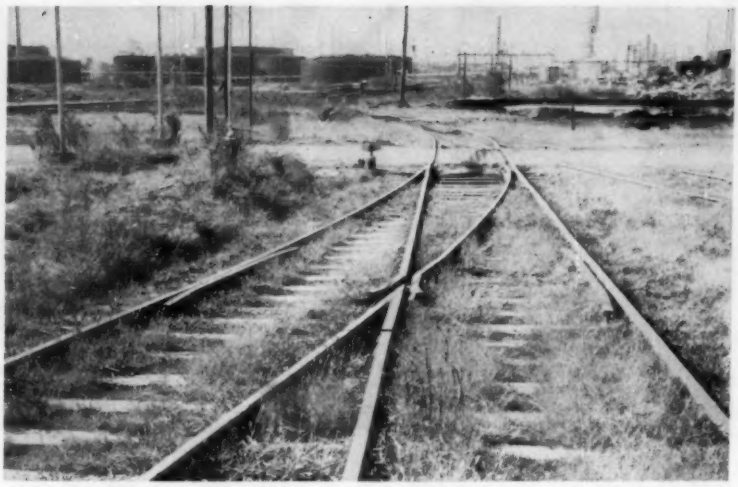


Fig. 2. With proper maintenance, this turnout could give proper service. Badly overgrown grass is a fire hazard and loose bolts have allowed the rail joints to open

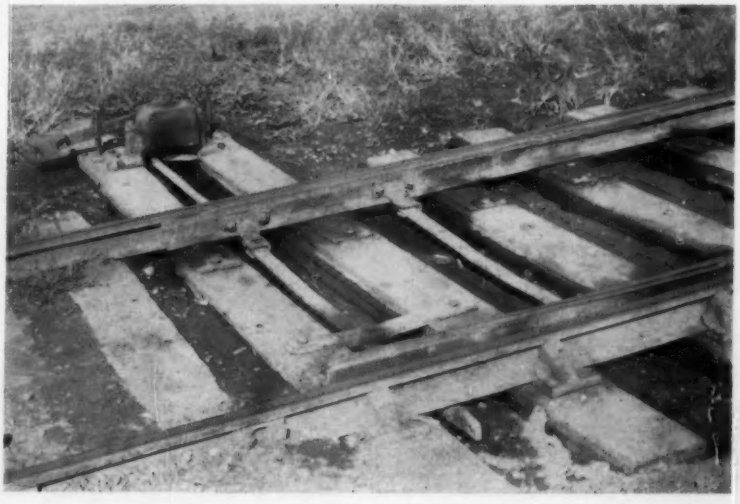
A switch stand consists of a base, a spindle and a throwing lever, together with cranks, gears or other fittings which transmit the circular motion of the throwing lever to a switch connecting rod. The most widely used type of switch stand is the ground-throw, in which the hand throwing lever travels in a vertical plane. If the throwing lever moves parallel to the track, this type is also called a parallel-throw switch stand. Switch stands can be either hand operated, automatic or adjustable for both.

Switch stand targets are of many styles, all designed to provide a distinctive indication of the location and operating position of the switch. They are usually made of sheet iron, bolted, riveted or strapped to the spindle near the top and painted with appropriate colors. Switch lamps are used in place of targets for night operation.

There are a substantial variety of frogs used in railroad work, including rigid frogs, which cover bolted or clamped patterns, manganese rail-bound, manganese solid and self-guarded types, and movable wing frogs and double spring rail frogs.

By far, the type most widely used for industrial service is the bolted rigid frog. It consists of two prepared rails known as long point and short point rails, which are joined at the so-called angle of frog to form the frog point, and the two wing rails, called the left or right hand wing rails with relation to the center line facing the point of frog. Other parts include the heel riser; toe, point, middle and flare

Fig. 3. Poor drainage of track foundation has led to this condition at the switch. Bolts are loose and points are worn. Switch stand is parallel-throw, low type



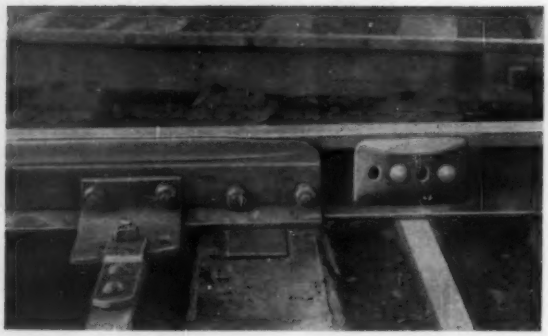


Fig. 4. Left: Switch purposely held open to show excessive damage at the switch point. This condition could cause a derailment. Fig. 5. Above: Typical installation of switch point protector, installed correctly ahead of the switch point

blocks or flangeway fillers; foot guards, tie plates or base plates; and the bolts and rivets that secure the parts together.

To prevent wheel flanges from striking the points of frogs, or the points of switches, guard rails are installed. In its simplest form, a guard rail is a piece of standard section rail that can be cut from a rail of standard length without waste. A portion at the middle is left straight, and the two ends are bent or curved to provide the required flares. The base is planed off to permit placing the head in proper relation to the running rail.

To maintain the correct position of the guard rail, rail braces, bolts with spacer chocks, clamps, tie plates or some combination of these are employed.

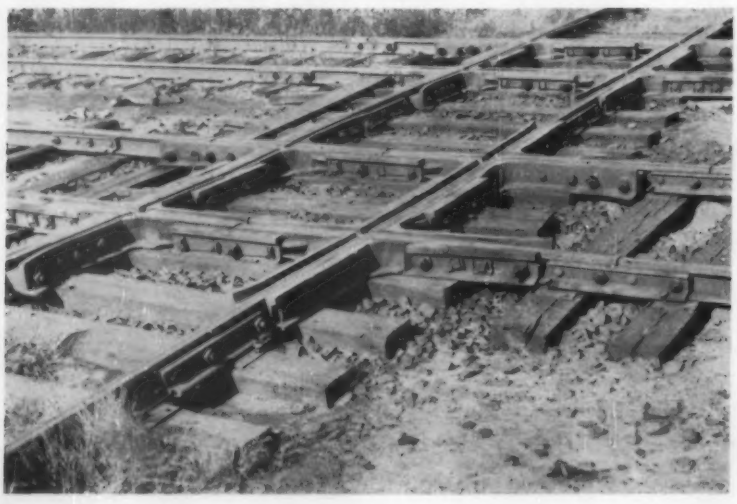
Track of special fabrication is used for lines running through paved areas, for track crossings and for track cranes with double flange wheels. A unit called a tongue switch and mate turnout is used in pavements, streets, plant floors and wharves where a smooth surface must be provided for various kinds of traffic and where standard open rail switches cannot be used. Where traffic is heavy, a manganese unit of this type is often used.

Railway crossings in general may be divided into four classes: (1) bolted crossings, (2) manganese steel insert crossings, (3) solid manganese steel crossings and (4) double slip switches with movable point crossings. For industrial work, the bolted crossing is most widely used. Where the angle of crossing is about 14 deg or less, a frog crossing is used. This is a bolted type unit which is similar in design and construction to a turnout frog.

As noted at the beginning of the article, a turnout is the sum total of components including switch, filler rails and frog, and necessary fastenings and auxiliary parts, that permit rolling stock to move smoothly from one track to a parallel track either left or right.

Although a turnout or any of its components can be obtained built to the specifications set by railroad engineering organizations, plants can substantially reduce new and replacement equipment costs by purchasing industrial specification parts rather than standard railroad specification parts. Both are carried by reputable dealers in the field. However, the industrial type are simplified, and therefore less expensive in construction, and are fully adequate for industrial applications.

Fig. 6. Railway crossings are divided into four classes. One of these is the bolted crossing, illustrated here, which is widely used for industrial work



Equipment Care

Maintenance procedures for switches, frogs, guard rails, etc., are similar to those discussed for rails, ties and other parts of the track structure. They should be checked for proper alignment and firm anchorage. Damaged or broken parts should be promptly replaced.

In cases of excessive wear or repeated damage, the installation should be examined to be sure that the proper parts are being used, or if the installation is properly designed. Guard rails, clamps, point protectors or other protective or fastening devices, previously omitted because traffic conditions did not seem to warrant their use, should now be installed.

It is important to note that in many cases it is not necessary to replace a complete assembly just because a part is damaged. For instance, if a switch stand is damaged, replacements for specific parts can be obtained from an equipment dealer.

When ordering replacement parts or units, careful note should be made of all dimensions insofar as lengths, widths, heights, angles, and location of drilling are concerned. Dimensioned sketch would be of help to the dealer.

Also, it is worthwhile to mention the type of service or application involved, because the dealer may be able to suggest a design or a construction which is serviceable but less expensive.

To complete the review of basic information on industrial trackage covered in this series of articles, some mention should be made of various accessories used with industrial trackage work. They are as follows:

Bumping posts — Used to prevent rolling stock from going off the ends of stub tracks. A comparatively lightweight, rigid clamp type steel post design is available for industrial plants. Weight of rail to be used should be specified when ordering a bumping post.

Car stops — A semi-portable unit used where heavier, permanent bumping posts are not required. It can be installed in a few minutes since rail drilling is eliminated.

Cushion wheel stop—A car stop designed for use at speeds no more than that of switching. A portable type, the stop clamps to the rail head.

Portable car block—A safety device for use where cars are loading or unloading. The block is locked to the rail by positive cam action, which freezes any car movement.

Car mover—A hand device used to move a car safely and with a minimum of effort. It straddles the rail head and rides the rail without slipping.

Rail skate—A device that rides the rails and is used for plowing down ballast and clearing cinder tracks. A tie or heavy board is placed in front of the skate and, as it is pushed forward, effectively clears ballast or obstructions from the track.

Derail—A safety device used to permit derailing of a locomotive or car at a specific point in order to prevent fouling of other tracks.

Rerailer—A safety device for rerailing rolling stock that has derailed through some accident. Built of special alloy steel, the device straddles the rails and is held in place by a locking cam or wedge on the outside of the track. Designed to eliminate makeshift and dangerous blocking, the device will rerail wheels from either side of the track.

Switch point heaters—Inexpensive, kerosene-burning devices used to melt the snow at the switch points. They are easily installed between ties under the switch points and are easy and economical to maintain. Substantial time and money can be saved with this device as compared with manual snow removal. Where weather or other conditions warrant, electric or propane gas permanent types are used.

Turntables—Available in simple designs for one-man operation, these devices can be used profitably at track crossings at plant entrances, etc. It eliminates the need for extra spur lines and backing and switching to move rolling stock from one track to the other.

As part of a coordinated industrial trackage maintenance program, it is important that the proper tools and supplies be kept on hand for quick repair service. While it has been previously pointed out that savings can be made by the use of industrial rather than railroad specification type equipment, for some applications, the contrary is true in the case of tools.

It is important that tools be purchased that meet American Railway Engineering Association standards. "Working on the railroad," to use an old refrain, subjects tools to fairly severe service, more so than in average industrial applications. The specifications set by the A.R.E.A. are designed to assure that track tools will be of rugged, sturdy construction and will have a long life. Also the tools are designed to permit maximum work efficiency with minimum of effort.

Track Tools for Plant Use

Following are some of the common track tools that should be part of a plant's equipment so that plant trackage can be properly maintained: Adze, full head and railroad type; railroad spike maul; blacksmith sledge; track chisel; blacksmith anvil chisel; single and/or double end track wrench; tie tongs; rail tongs; spike puller; lining bar; track pick; track liner; track jack; and track level and track gage.

The plant's Maintenance Department should also keep on hand a quantity of bolts, spikes, washers and other miscellaneous fastenings and small accessories used in quantity. With proper maintenance, your track system will give you long, trouble-free service.

Fig. 7. Below: Mud that has collected between rail and switch point can cause trouble—and possible derailment. Fig. 8. Right: Badly worn frog, reflects result of poor maintenance. Frog is cluttered with debris, some bolts are loose

Fig. 1. The stockpicker uses this cart to deliver products to the packaging area

Shipping facilities were congested and inadequate . . . Investigation revealed that one of the old plant buildings would fit the expansion bill . . . Coupled with a streamlined packaging system and good truck handling, use of this structure resulted in improvement

Steel Storage Shed is Key To Better Shipping Operations

By **RUSSELL M. SHADE**, Superintendent, Physical Stores and Traffic Division
The Jeffrey Manufacturing Company, Columbus, Ohio

BOTTLENECKS and inefficiencies result from shipping operations that are not geared to those of production. When the volume of goods gravitating to the shipping area is large these conditions are magnified.

Our Columbus plant is an extensive one with a number of shipping points within it. However, this article will confine itself mainly to the shipping facilities for handling mining equipment and related parts.

Formerly, the area used for the shipment of this type of products was small and congested. Its location made it awkward for roadway trucks to reach it; in addition, only one truck could be handled at a time. The fact that the shipping department had to share the building and handling equipment with another department did not help matters. A solution to this undesirable set-up became rather urgent.

In the search for a suitable area from which mining products could be dispatched, use of an old steel storage building presented itself as a possible solution to the problem. It had good accessibility by rail and truck; a spur line ran right into the building and a plant roadway as well as a public street ran past it. A certain amount of face lifting and change had to be taken care of before the storage shed would be considered adequate for its new function.

Five electrically operated doors were installed in the building facing the plant roadway. The truck approach floor had to be laid at a level to meet the roadway. The loading dock was equipped with hydraulic ramps to handle trucks with various floor levels. A major outlay for overhead handling was unnecessary inasmuch as the existing overhead crane was considered adequate. Beside floor type handling equipment, jib booms were installed to supplement the crane.

Our plans called for using an adjoining building for storage and packaging purposes. Reasonably close to the shipping building, steel bins were located at right angles to an aisle which leads directly to the packaging lines and eventually to the shipping area. Numbered bin compartments

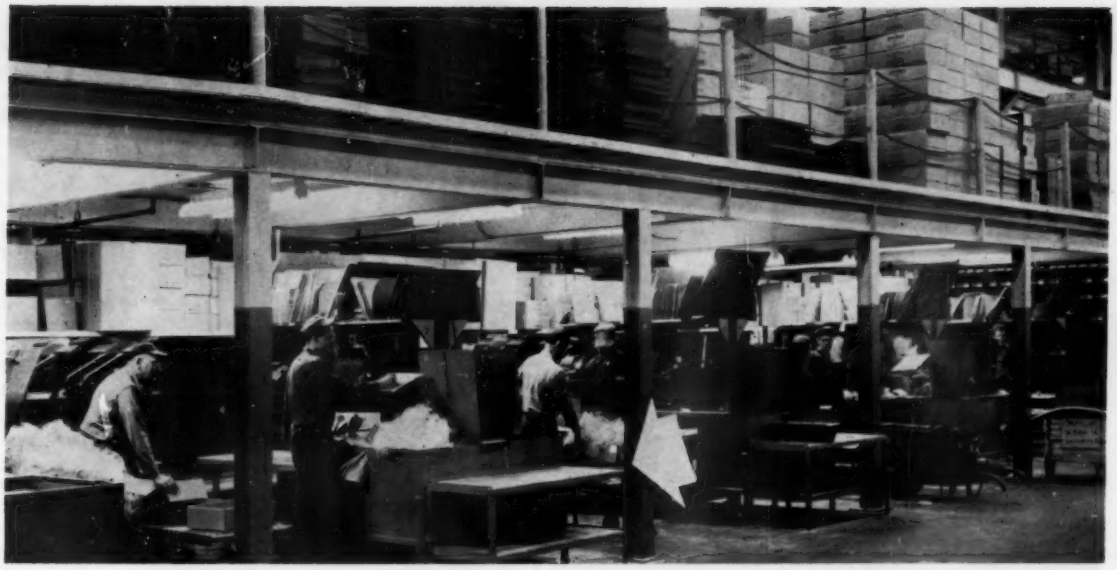


Fig. 2. Packaging benches are arranged in row at right angles to slat conveyor, not shown. Cartons are stored above

make it easier for employees to pick out the necessary items.

Items in these bins are stored on the basis of their popularity. Over a period of time a study of the frequencies of requests for different parts was made. As a result, the products with the greatest demand are stored closest to the shipping point.

After material requisition cards are received in the storeroom office, the bin and compartment numbers are written on them. This helps the stockpicker expedite the orders. As an aid in his work, the stockpicker has a shopmade cart, Fig. 1, with several tiers for carrying tote pans with small parts. The bins are of step design, as shown, permitting the stockpicker to walk on top of the lower compartments in order to reach items in the upper compartments.

After the orders have been taken care of, the stockpicker moves the cart down the aisle to the packaging line. The tote pans are taken out and left on a steel bench near one of the packing stations, arrow, Fig. 2. There are a number of these stations equipped with tools and packaging material to get the items on their way in good shape. A roller conveyor is located between each pair of packaging benches making it easier to handle the heavier items. Each of these conveyors connects with the main slat-type powered conveyor which takes the packages to the weigh stations. Fig. 3.

Storage of packaging cartons combines the economy of floor space utilization and convenience, Fig. 2. The space underneath the mezzanine is illuminated with fluorescent lights which give good visibility to the employees.

The conveyorized packaging system that has been mentioned chiefly

Fig. 3. Roller conveyors are located between benches; this permits large cartons to be packed, moved without lifting

Fig. 4. There are two parallel conveyor sections linked to scales for weighing cartons fed by powered slat conveyor

Fig. 5. In this area items are packaged for shipment to the company warehouses

Fig. 6. Heavy-duty dolly is handy in moving the bulky pieces between buildings

serves to fill customers orders directly. Some of our products are shipped from local warehouses whose stock is replenished by shipment from this plant. These warehouse-destined goods are packaged in a separate area which is located across the aisle from the conveyor lines, Fig. 5. Here the operations are quite similar but do not have the use of conveyors inasmuch as the requirements are somewhat different.

Material from the two packaging areas as well as from other sections in the plant eventually arrive in the converted shipping building. Much of the handling is done by industrial trucks, particularly the heavier parts. A large dolly is sometimes used, Fig. 6, to move items from the adjoining building to the shipping building. This carrier also comes in handy to transfer large items from one crane service area to where the shipping room crane can get hold of it.

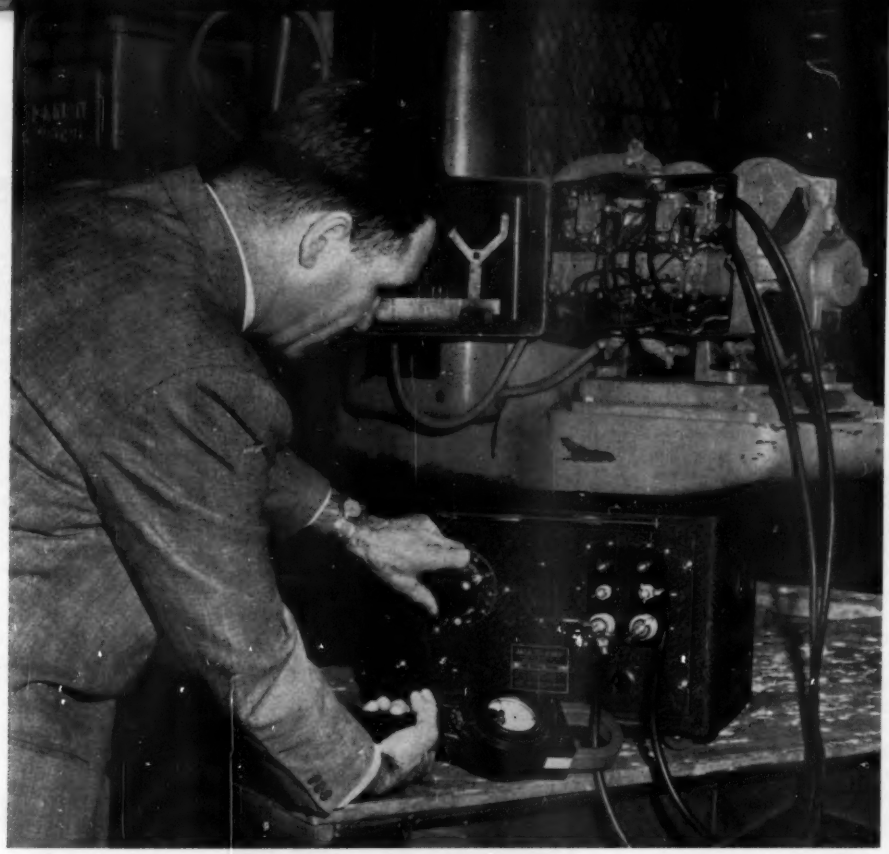
The floor of the shipping building has areas set aside by painted lines to separate the outgoing items having a different processing status. Some are ready for loading, some have to be crated and others wait for additional items to complete an order.

A two-way communication system links shipping, storage and order files offices with the shipping room loading dock; this results in better control of related operations and faster expediting of orders.

Loaded trucks leaving the shipping docks all turn in one direction and thus avoid tie-ups commonly experience with two-way traffic, Fig. 8. We have handled as much as one vehicle every seven minutes.

Fig. 7. Shipping dock has adjustable truck loading ramps

Fig. 8. One way traffic system is used by the departing trucks



Instrument engineer checks motor driving production equipment with "on-the-spot" tester

Planned Electrical Maintenance—
Portable Tester, Record Cards, Do the Job

By S. J. BARTOS, Maintenance Foreman
The Carborundum Co., Refractories Division, Perth Amboy, N. J.

SWITCH-OVER TO A completely modern electrical power distribution system has answered a lot of our production and maintenance problems. At the same time we are aiming at maximum benefits from this equipment through a planned program of preventive maintenance.

Our revamped system, of course, is equipped with essential circuit breakers and other safety devices. To these mechanical elements, in the functioning of which there always have to be certain elements of trust, we have added the newest electrical testing equipment. And to trust and test still another factor is to be added... that will convert maintenance to what we prefer to call "Productive Maintenance."

This third component is a visible card system of control records for scheduling inspections and tests of electrical equipment and for recording the results. It will be a part of our over-all productive maintenance program covering the management and care of all buildings and equipment used in the manufacturing operations, from raw material receipt and handling, to the crushing, mixing, forming and firing of super refractories made by this division.

Our plant, being highly mechanized, depends to a great degree on the proper functioning of electric motors. These range in size from small fractional horsepower units up to and including 75 hp motors.

The majority of these motors are critical, from a production standpoint. While failure of any of the six big motors that operate two ball mills, three pan mills and one hammer mill (in part of the crushing operations) would not result in spoilage it would mean serious and costly delays in production scheduling.

Similarly, in other milling operations and in the mixing, forming and firing processes the motors are ranked according to their importance in the production line. For example, critical motors are the four (60, 50, 40 and 35 hp) units that operate the dust collecting systems. Should one of these fail because of an overload trip in a magnetic starter not being in operating condition, it would mean that the entire staff of a major department would be idle or would have to be temporarily reassigned, for half a day or more until motor repairs could be made.

To help us to properly maintain motor starting equipment and also circuit breakers, we recently secured a new testing device known as the Multi-Amp. This instrument permits checking circuit breakers, heater elements and other components of the electrical system and control devices without removing them from working positions.

(Continued on page 158)

Selection Guide for Flexible Metallic Tubing and Hose

Flexible connections that will convey materials are invaluable in industrial applications . . . Author lists and describes several types and their uses . . . Basic construction features are highlighted to aid in correct selection

By **WILLIAM TOWNSEND**, Pennsylvania Flexible Metallic Tubing Co.

FOUR FACTORS determine the construction features to be used in flexible metallic hose for today's industrial applications. These are operating pressure, operating temperature, corrosiveness of the material to be conveyed, and the actual operating conditions as to time and usage.

The capacity to withstand pressure is obtained by firmly compressing an asbestos packing into a specially-prepared packing groove in the interlocked section, to form a pressure seal. This high commercial grade packing is asbestos. It is impregnated in a boiled linseed oil solution before it is introduced into the metal hose section, in order to facilitate the compressing of the asbestos to form the pressure seal. See Fig. 1.

Operating temperatures determine the type of external connection between existing piping and the flexible metallic hose unit. The two main types of end connections are the soldered coupling, attached by means of tin lead solder, and the packed or heatproof coupling, attached by mechanical means and using asbestos as its pressure seal. The soldered connection is satisfactory for temperatures under 250 F, but for higher temperatures the pack-on connection is required.

The corrosiveness of the material to be conveyed will largely determine the metal used for the flexible hose. Electro-galvanized steel is satisfactory for oil, grease, hot tar, paint, gas, air, or most other free-flowing materials or liquids. For water or steam, which would tend to corrode galvanized steel, a high copper bronze unit, 98½ per cent copper and 1½ per cent tin, should be specified.

Recently there has been a demand, especially in the chemical field, for more lightly resistant metals in the stainless steel, Monel, and ambrac group. Three types of stainless steel can be satisfactorily used for flexible metal hose. For light corrosives, Type 302 is satisfactory, but for heavy acids and other highly corrosive chemicals, and high heat, Type 316 and Type 347 are preferable. In using any of these stainless steels, couplings should be made from the same metal, since the corrosive requirements extend to the end fittings also.

All photos: Pennsylvania Flexible Metallic Tubing Co.

Fig. 1. Four-wall, packed, interlocked

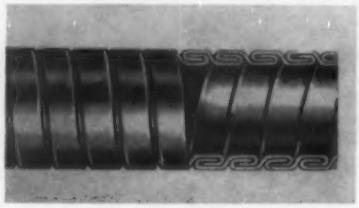


Fig. 2. Unpacked low pressure tubing

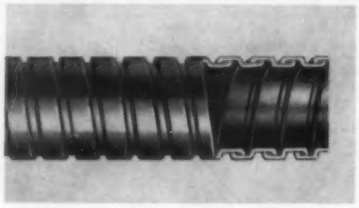


Fig. 3. Interlocked tubing, electrical

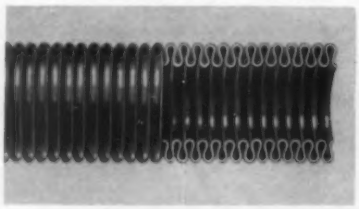


Fig. 4. Corrugated tubing, light duty

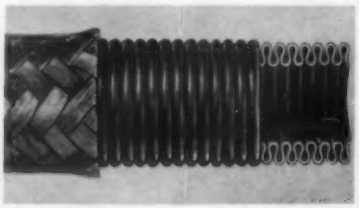


Fig. 5. Tubing with braided protection

Operating conditions will frequently modify the normal service requirements. Suppose that a flexible metal hose unit were needed as a temporary steam connection for a short period of time. Although steam normally requires a high copper bronze, the time element would indicate that a galvanized steel tube could be satisfactorily used, at an initial saving of about one-half.

In addition to the asbestos-packed pressure type of hose, the full interlocked construction is also used in a non-pressure type with the packing eliminated. See Fig. 2. This is used to convey air, to carry off exhaust fumes, and to convey sawdust and other light materials. A large number of such units are used by the Navy for welding operations. In this application, the tubing units are connected to suction blowers and the flexible metal hose is directed at the cutting flame of the welder's torch. By this means, the smoke, gases, sparks and metal chips which normally retard the welder's operation are removed at the source of his flame.

Besides the full interlocked section, there is also a modified section available for certain special applications. This is the square-locked section used to cover electric wiring for protection. With the introduction of a packing, it forms an especially flexible unit for use as a spout for conveying liquid under gravity but not under pressure. See Fig. 3.

Flexible metallic hose differs from tubing in its basic construction. In the flexible pressure-carrying field, the term "hose" designates a spirally wound flexible unit made from a ribbon of metal which has been wound and interlocked on a sizing mandrel. "Tubing" designates the convoluted construction which is manufactured from a seamless drawn tubing or from a strip which has been pre-formed into a seamless tube.

The spirally wound flexible metallic

hose is ideally suited to a vast number of applications, but there are certain liquids which would have a tendency to attack such a unit and eventually cause it to leak. This particular need brought about the development of the second type of flexible metallic tubing, which is completely seep-proof, even with volatiles and liquids of the hard-to-hold, searching type.

The seamless, convoluted tubing unit, was first developed in Switzerland and is licensed to companies in the United States. The convoluted construction may be of two types. The first is a seamless drawn tubing, made to exact size and then corrugated to form the flexible unit. The second type, employs a metal strip which is formed into a tubing and welded longitudinally to provide a seamless, rigid tube.

The same basic requirements which govern the choice of metals in the spirally wound hose also extend to the convoluted tubing unit.

In choosing between the interlocked section or the seamless convoluted tubing, the actual service is the determining factor. Such materials as gasoline, benzine, ammonia, freon, or any of the materials in the benzine range, or from propane or butane gases, will require the seep-proof, seamless unit.

When this type of tubing is indicated for pressure work, a wire-braided reinforcement is added, since pressure would have a tendency to return the corrugations to their original smooth tubular form. The wire braid is placed over the tubing and firmly anchored in the end connections. The more force exerted on the end connections by the internal pressure, the tighter the braiding grips the tubing.

Under severe pressure conditions, it has been found that the braiding actually etches the outside of the metal, so great is the force exerted by this covering. Burst condition occurs when the braiding wire ruptures. Since the normal factor of safety is five, a tubing unit with a 2,000-lb bursting pressure would have an operating pressure of 400 psi.

In these various types of flexible metallic hose and tubing, industry has a modern engineering product of almost unlimited utility. Wherever hose or tubing in large or small sizes is subjected to tough service conditions, these units can add months or years to service life. Both the spirally wound and the convoluted types are normally free from the constant stretching and compression which must take place in hose or tubing having solid continuous wall structure. Where vibration is a factor, the danger of breaks and leakage due to vibration fatigue are eliminated. Where connections are made between moving parts of machinery, the ability to make mechanically strong, tight, metal-to-metal joints is a particular advantage.

Specific applications are found in almost every industrial field: automotive, machine tools, road-building and general maintenance.

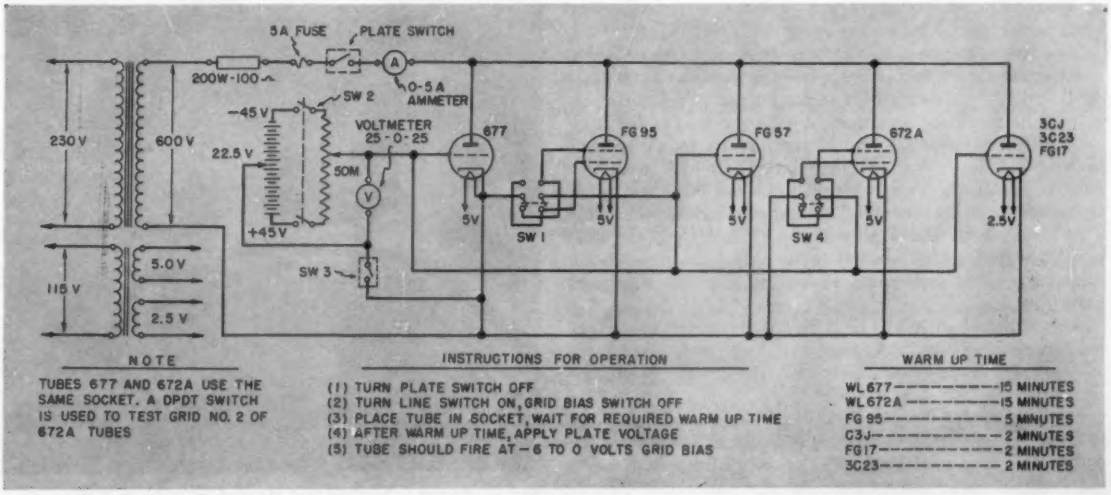
Tube Tester Proves Popular— Wiring Diagram Presented as Construction Guide

ELECTRICAL MAINTENANCE MEN at Ryan Aeronautical Company, San Diego, have apparently set off another "do-it-yourself" operation. The description of their shop-made tube tester for Thyratron tubes, which appeared on page 95 of PLANT ENGINEERING's November issue, has prompted inquiries for complete information on the tester and its construction.

To answer the requests, we contacted William Brotherton, in Ryan's Public Relations office, and the wiring diagram presented here is Ryan's contribution to the readers of PLANT ENGINEERING who are interested in constructing their own tester.

The simple operating instructions, shown on the wiring diagram, reflect the ease of application of the tester. In addition to its use in detecting defective tubes, the tester has served as a re-rating medium. Tubes found inadequate for a particular application can be analyzed for an installation suited to their capacity.

According to Mr. Brotherton, requests have been received at Ryan in addition to those received at this office, for details of the tester construction—clear indication that our readers consider a tube tester of this type a valuable addition to an electrician's tools.



Wiring diagram of tester for Thyratron tubes. Simple operating guide shows sequence followed by Ryan electricians

Fig. 1. Air drill is attached to the plate at end of pit car

Air Drill Drives Heavy Mold Car

Pneumatic unit provides the answer to a power transmission problem . . . Hand cranking for moving mold cars to and from the furnaces is eliminated . . . Air input is controlled by means of a hand throttle

By D. G. PHILP, Div. Chief Engineer
Bohn Aluminum & Brass Corp., Detroit

MODIFICATION of our melting furnaces to boost their melting capacity and increase production, resulted in a fatigue problem involving the operators of the auxiliary mold equipment. A hand-cranked device mounted on each mold car was previously used to move the heavy units away from the pouring position.

It was decided to substitute power drives on the mold cars and include simple controls. However, there were a number of obstacles to be considered in making such changes.

The drives had to be able to withstand elevated temperatures since they would have to operate in the vicinity of molten brass. In addition to this there would be a possibility of electrical grounding from molten metal splashing on electrical components. There would also be occasions when water would be thrown over the mold caps.

Thought was given to the use of a cable and winch, and electric motor with a speed reducer, and an air motor. Specifically, the drive power requirements called for 2 hp with an infinitely variable truck speed from zero to 125 fpm.

Of all the possibilities considered, the air motor seemed to have all the operating characteristics which were required. However, it was thought to be too large for quick replacement in the event of mechanical failure.

In our search for a solution, we came across a low speed air drill which we put to use. It is mounted on a supporting plate extending above the floor of the mold cars, Fig. 1.

The output shaft of the drill unit is connected to a right angle gear box that has a one to one ratio. Torque from the gear box is transmitted through sprockets and a chain to the flanged wheel of the truck, Fig. 2.

Compressed air for the drive is supplied through a large windup reel which is located in a recess at the end of the casting pit, Fig. 2 (inset). The amount of air that enters the drill unit is adjusted by means of a motorcycle throttle type of control, Fig. 1, arrow.

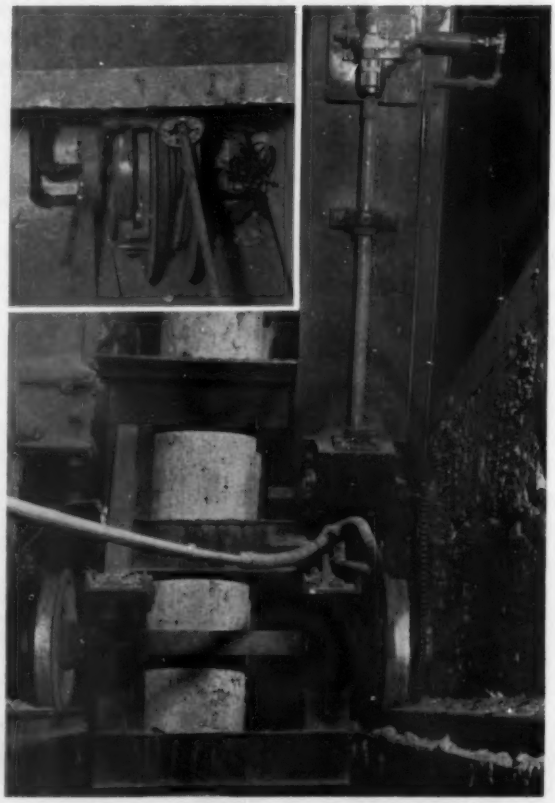


Fig. 2. Power is transmitted through gear box. Self-winding reel (inset) helps supply the air to the traveling drill unit

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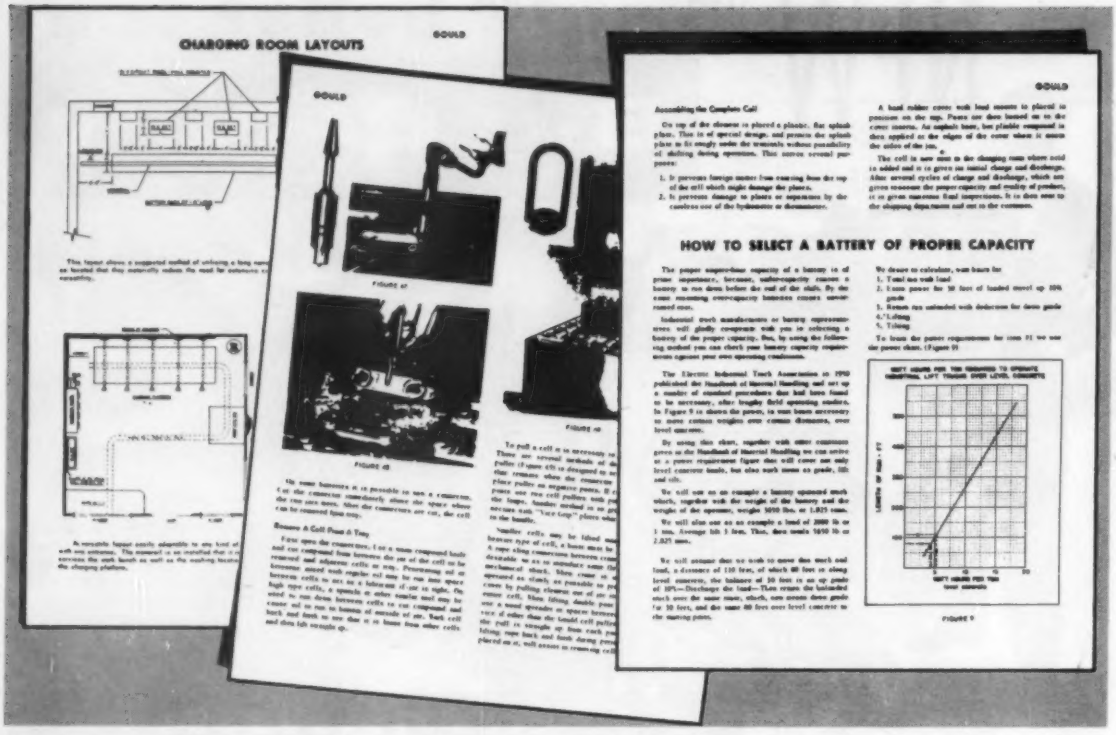


Several pages of this 44-page training manual are reproduced here. Manual is divided into ten sections, beginning with an explanation of what happens inside the battery to the best method for laying out an industrial battery charging room

Battery Care and Maintenance In Ten Easy Lessons

Here's another helpful booklet for plant engineers . . . This one covers instructions on maintenance of industrial batteries . . . Could very well serve as a textbook for the new men

KNOWLEDGE OF THE inner workings of a battery is a helpful asset in obtaining top performance and longer life from their use in industry.

Realizing this, Gould-National Batteries, Inc., has just put out a 44-page training manual to help the plant engineer explain the battery operation to the new men in the plant.

The manual begins with an explanation of what happens inside the battery. The second lesson covers the construction of a lead-acid battery, discussing the unit cell and the battery construction, consisting of the grids, retainers, separators and then final assembly.

Charging the battery is another important phase which should be given careful attention. The manual explains the correct charging methods as well as a discussion of the equipment used for controlling the charge. Following this is a brief review of available charging apparatus.

To maintain the top performance of industrial batteries, the manual suggests a periodic check of battery condition through records, testing the discharge and by internal inspection. The cause and treatment of "sulphated" batteries as well as hydrometer and thermometer maintenance are also mentioned in this section.

In case you should have trouble with the functioning of the battery it may be necessary to take it apart for maintenance and repair. This helpful manual covers the various checkpoints to examine for possible trouble and explains what steps should be followed in making repairs and replacing parts.

The layout of the battery charging room is another phase of battery operation which, if equipment is properly arranged, will give you the best service facilities for maintaining industrial batteries.

Want a Copy?

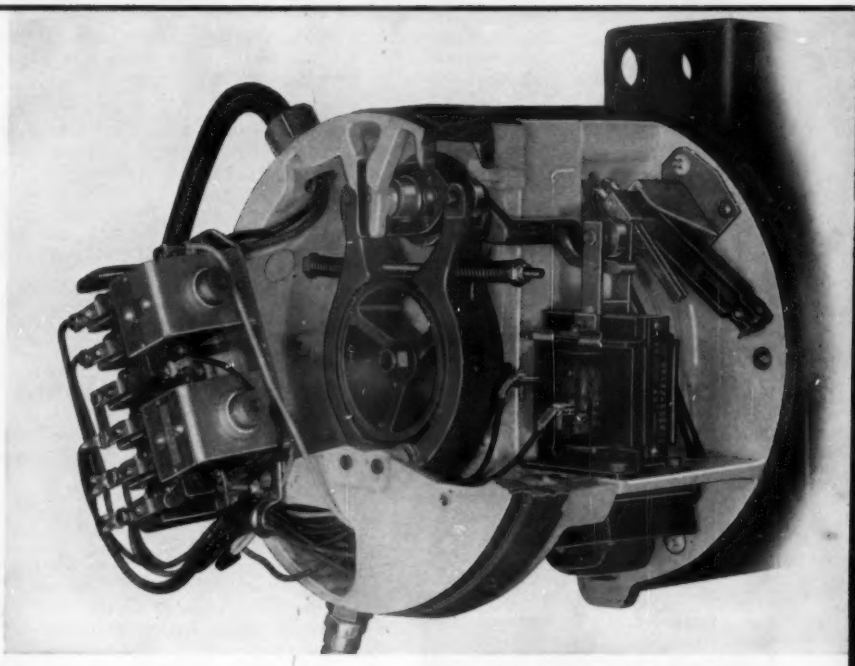
If you would like a copy of this training manual produced by Gould-National Batteries, Inc., just drop the editor a line, or write "Battery Training Manual" on the bottom of the postage-paid card elsewhere in this issue and mail it to us.

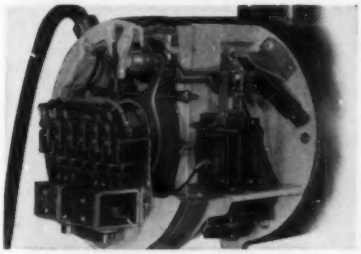
ACCO products

Why WRIGHT Hoists Smash Maintenance Costs!

NOTHING COULD BE EASIER TO SERVICE THAN THIS 1954 MODEL WRIGHT FRAME 1 HOIST

This partly cut-away illustration (with controller swung out of position) shows the full accessibility of parts provided in the 1954 models of WRIGHT *Frame 1 Speedway Hoists. Note the simple, rugged design of brake and solenoid assembly.*





Controller back in operating position. Note that brake cam can be reset without moving controller.

What Plant Men Are Saying about Frame 1 Wright Hoists . . .

Chief Electrician says: "Now we have a hoist that is simple to service."

Maintenance Superintendent says: "We are going to buy one of those hoists, put it on our toughest job and equip the brake with a counter. I'll bet that brake will operate a million times without an adjustment. This is what we've been waiting for, it's a cinch to get at, and we can adjust the brake, and do it right, in a matter of minutes."

Plant Engineer says: "If all small hoists were new WRIGHT SPEEDWAYS, we could sure cut our maintenance costs."

Electrician says: "I like the way the electrical controls are grouped, and they're easy to get at."

• • •

Long life is a built-in characteristic of these hoists. They are built and guaranteed for service to the limit of the duty cycle of 1½ H.P., 30 minute, totally enclosed NEMA specification motors. On WRIGHT 1954 Model brakes THERE IS NOTHING TO ADJUST BUT THE CAM!

Write for this New Booklet

This new booklet (#DH133B) *gives complete information on the 1954 Model WRIGHT SPEEDWAY ELECTRIC HOISTS, Frame 1 and 1½ (500 to 4000 lb. capacities). The booklet fully describes and illustrates the new designs and features that minimize maintenance costs, and make WRIGHT Speedway Frame 1 and Frame 1½ Electric Hoists the easiest of all hoists to adjust and service. Write our York, Pa., office for a copy of this Booklet #DH133B.*

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NEW PLANT CONSTRUCTION — advance information on location, costs

Demopolis, Ala. — Gulf States Paper Corp., Tuscaloosa, Ala., kraft paper products, is reported planning new pulp and paper mill for kraft bag manufacture at Demopolis. It will comprise a main one-story building and several auxiliary structures, reported to cost over $600,000, with equipment.

Huntsville, Ala.—Norton Co., 1 New Bond St., Worcester, Mass., abrasive products, grinding wheels, refractory materials, etc., has authorized new plant at Huntsville, where tract of about 100 acres of land has been secured. Work will comprise two main electric furnace units for production of refractory grain, fused zirconia, etc., and a number of one-story buildings. Large capacity will be developed. Cost reported about $1,250,000.

Sheffield, Ala.—Diamond Alkali Co., Union Commerce Bldg., Cleveland, Ohio, soda ash, caustic soda, heavy chemicals, etc., has authorized expansion and modernization in chlorine and caustic soda plant at Muscle Shoals, near Sheffield, formerly owned by Government and acquired by company late in 1953. A number of new structures will be erected, and additional machinery installed. No estimate of cost announced — will represent large investment. Leonard Construction Co., Chicago, Ill., is in charge of project.

El Segundo, Calif.—Douglas Aircraft Co., Inc., 827 Lapham St., airplanes and parts, has approved plans for one-story addition to local assembling plant, about 26,000 sq ft floor space, and will begin work soon. Cost reported over $750,000, with equipment.

Los Angeles, Calif.—Stauffer Chemical Co., 636 California St., San Francisco, Calif., sulphur, boric acid, commercial fertilizers, etc., has authorized expansion in commercial fertilizer plant at Vernon, near Los Angeles. Work will comprise a number of new one-story structures, with processing and production facilities for pelletized superphosphate and other ammonium phosphate fertilizers. Cost reported over $1,000,000.

Mojave, Calif. — California Portland Cement Co., 612 South Flower St., Los Angeles, Calif., has plans maturing for new mill for production of portland cement at Mojave (Kern County), where large tract of land has been secured. It will comprise a series of one- and multi-story structures, equipped for large capacity. Cost reported close to $12,000,000. Donald P. Warran, Los Angeles, is engineer.

Oakland, Calif.—Liquid Carbonic Corp., 3100 South Kedzie Ave., Chicago, Ill., carbonic and industrial gas equipment, compressed gas tanks, etc., has preliminary plans under way for new branch plant at Oakland, comprising a main one-story building and several smaller structures. Cost reported in excess of $1,500,000, with equipment. Pacific Coast offices at 236 Steuart St., San Francisco, Calif.

Richmond, Calif.—Standard Oil Co. of California, Inc., 225 Bush St., San Francisco, Calif., has plans for new petrochemical plant at Richmond, in vicinity of oil refinery at that place. It will comprise several one- and multi-story structures, with processing and other equipment for large output. Cost reported over $5,000,000.

San Francisco, Calif.—S. & W. Fine Foods, Inc., 155 Berry St., prepared food products, coffee, spices, etc., plans new plant on local site for coffee-mixing and roasting, and other food products manufacture. It will comprise a main one- and two-story building, about 250,000 sq ft floor space. Cost estimated close to $1,600,000. Work will be carried out during 1955. Albert F. Roller, San Francisco, is architect.

Bridgeport, Conn.—Bullard Co., 286 Canfield Ave., machine tools, has plans for new foundry for production of grey iron castings for company service, to be located on site in vicinity of Black Rock Turnpike. New unit will be one-story, completely mechanized, reported to cost over $2,000,000. Alexander D. Crossett & Associates, New York, N. Y., is architect and engineer.

Palatka, Fla.—Hudson Pulp & Paper Corp., Southern Div., kraft pulp and paper, converted paper specialties, has authorized an expansion program at local mill, to provide equipment and facilities for production of tissue papers, a new line of output for company. Work will comprise a number of new one- and multi-story additions, installation of bleaching plant, filter plant, recovery unit, etc. Work is scheduled for completion in summer of 1956. Cost reported about $15,000,000. Main offices of company are at 505 Park Ave., New York, N. Y.

Pensacola, Fla. — United Gas Corp., 1525 Fairfield Ave., Shreveport, La., operating natural gas properties, is projecting plans for new petrochemical plant in vicinity of Pensacola. It will consist of a series of one- and multi-story buildings, with processing and other equipment for large output. Entire project reported to cost over $20,000,000.

Glenview, Ill. — Signode Steel Strapping Co., 2600 North Western Ave., Chicago, Ill., steel strapping and equipment for all types of containers, will begin work on superstructure soon for new one-story plant, about 235 by 320 ft, at Glenview, near Chicago. Project will be carried out during 1955 and is reported to cost about $5,000,000. Skidmore, Owings & Merrill, Chicago, are architects.

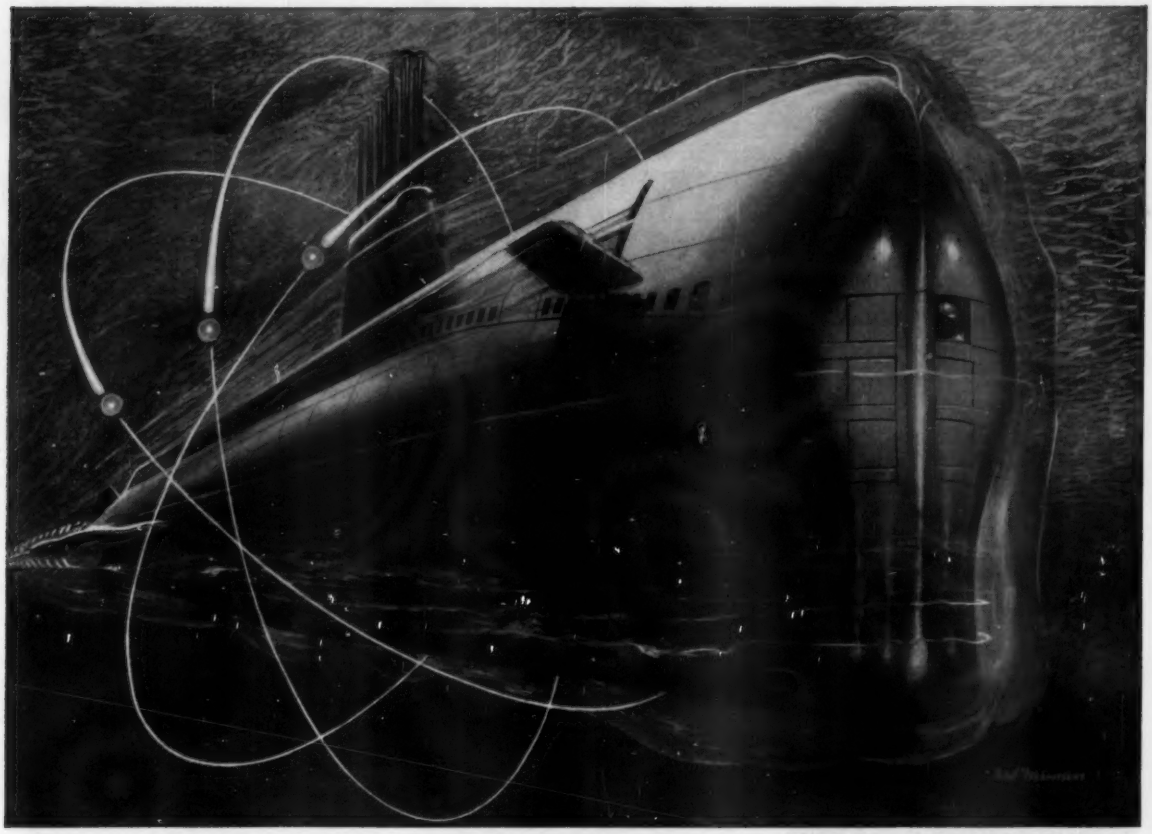
Michigan City, Ind.—Scholl Mfg. Co., Inc., 213 West Schiller St., Chicago, Ill., orthopedic appliances, adhesive tapes, etc., has plans in progress for new plant at Michigan City, where site has been selected. It will consist of a main one-story building and several auxiliary structures, reported to cost in excess of $500,000, with equipment. Hylmar Keil Associates, LaPorte, Ind., are architects.

Olin, Ind. — Olin-Mathieson Chemical Corp., subsidiary of Olin Industries, Inc., East Alton, Ill., and Mathieson

Caterpillar Tractor Company's new plant at Decatur, Ill., is rising rapidly. The project is part of a $45 million expansion that will provide for manufacture of tractors and motor graders

Chemical Corp., Baltimore, Md., has plans in progress for new plant for manufacture of cellophane at Olin, near Danville, Ind., where site has been secured on Wabash River. It will comprise a number of one- and multi-story buildings, and will be equipped for an initial output of 33 million lb of finished cellophane annually. Project will be carried out in 1955. Cost estimated, several million dollars. Engineering department, E. I. du Pont de Nemours & Co., du Pont Bldg., Wilmington, Del., will supervise construction.

Louisville, Ky.—Marley Co., 600 Bergman St., water cooling equipment, tanks and other plate work, has approved plans for new one-story addition to local plant, reported to cost over $250,000, with equipment. Project will be carried out soon. Joseph &



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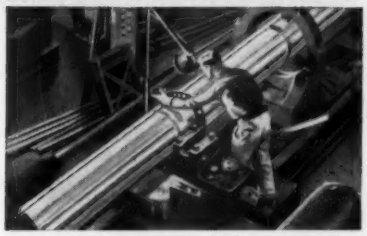
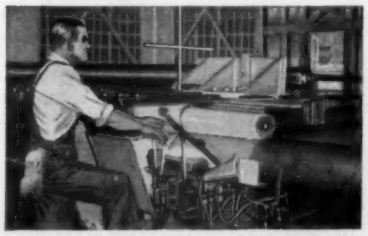


A snorkel intake tube being machined to very precise tolerances on one of the large lathes in the Groton plant.



Hydraulic bender shapes section of 8-in. steel pipe in two minutes. This operation formerly took a full day.

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NEW PLANT CONSTRUCTION

Joseph, Louisville, are architects. Main offices of company are at 222 West Gregory Blvd., Kansas City, Mo.

Russellville, Ky.—Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh, Pa., recording meters for gas, oil and other service, plans new plant at Russellville, where site has been selected. It will be one-story, about 100,000 sq ft floor space, equipped for large capacity for parts manufacture and assembling. Cost reported in excess of $850,000.

Sanford, Me.—Consolidated National Shoe Co., 179 Lincoln St., Boston, Mass., boots and shoes for men and women, has purchased a two-story building, about 60,000 sq ft floor space, at Sanford, previously used as a textile mill. Structure will be remodeled and improved, and equipment installed to give employment to about 200 persons. Project reported to cost approximately $500,000.

Baltimore, Md.—Westinghouse Electric Corp., Air Arm Div., Fort Meade Rd., electric equipment for aviation, marine and other sevice, has plans for new two-story addition to local plant for increased capacity. Cost reported close to $1,000,000.

Natick, Mass.—Carling Brewing Co., 9400 Quincy St., Cleveland, Ohio, beer, ale, yeast, etc., has approved plans for new branch brewery at Natick, where large tract of land has been secured. It will consist of several two-, four-, five-story structures, to be equipped for large capacity. Entire project is reported to cost about $10,000,000.

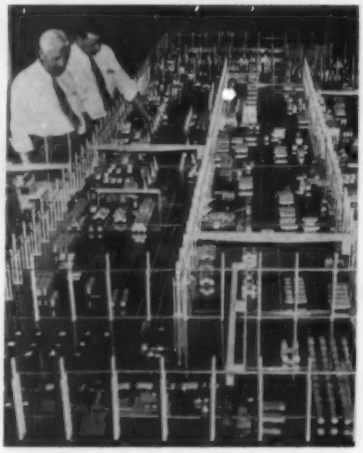
Waltham, Mass.—Tracerlab, Inc., 130 High St., Boston, Mass., radioactive instruments and parts, special chemicals, etc., has approved plans for new plant at Waltham. It will comprise several one-story units, and is reported to cost over $1,000,000. Present plant will be removed to new location when buildings are available. Edwin T. Steffian is architect; Cleverdon Varney & Pike are engineers, both Boston.

New Ulm, Minn.—Kraft Foods Co., 500 North Peshtigo Court, Chicago, Ill., processed cheese and other prepared food products, confectionery, etc., plans new one- and two-story food processing plant at New Ulm, where site has been secured. It will be about 170 by 550 ft, equipped for large output. Cost reported close to $500,000.

Oxford, Miss.—Chambers Corp., Shelbyville, Ind., gas ranges and parts, has arranged for construction of new plant at Oxford, where site of 25 acres of land has been selected. Structure will approximate 100,000 sq ft floor space, and will be occupied under long-term lease. Entire project will represent a reported investment in excess of $1,500,000.

Berlin, N. H.—Brown Co., coated and other paper stocks, crepe paper, etc., has preliminary plans under way for new addition to plant, to be equipped as a sulphate pulp bleachery. Work will comprise several multi-story structures, with installation of equipment and facilities for large capacity. Cost reported close to $10,000,000.

Deepwater Point, N. J.—E. I. du Pont de Nemours & Co., organic chemicals department, Rubber Chemicals Div., Wilmington, Del., has authorized new plant for production of polyisocyanates, a line of chemicals used in manufacture of adhesives, plastics, etc., at Chambers Works, Deepwater Point. It will comprise several large one- and multi-story buildings, equipped for heavy output. No estimate of cost announced—will represent an expenditure of several million dollars. Company engineering department in charge.



Project engineers study scale model of layout of new aluminum sheet and foil rolling mill to be built by Kaiser Aluminum & Chemical Corp. in the Ohio River Valley near Ravenswood, W. Va.

Carlsbad, N. M.—Freeport Sulphur Co., 161 East 42nd St., New York, N. Y., and Pittsburgh Consolidation Coal Co., Koppers Bldg., Pittsburgh, Pa., plan joint construction of new potash plant at Carlsbad. It will comprise several large one- and multi-story structures, with processing and other equipment for heavy output. Project will include a complete mining plant for raw material supply. Cost reported in excess of $10,000,000.

New York, N. Y.—Lone Star Cement Corp., 100 Park Ave., portland cement, has authorized an expansion and modernization program at three main mills, at Nazareth, Pa., Bonner Springs, Kan., and Green Castle, Ind., to be carried out over a period of 24 months. Work will include new buildings, with installation of additional equipment, including mechanical-handling facilities. Entire project will cost over $10,000,000.

Gastonia, N. C.—Hinde & Daugh Paper Co., Sandusky, Ohio, corrugated fiber shipping boxes and containers, plans new plant at Gastonia, where site has been selected. It will be one-story, approximating 160,000 sq ft floor space. Cost reported close to $500,000.

Independence, Ohio—Efficient Tool & Die Co., 9314 Elizabeth Ave., Cleveland, Ohio, tools, dies and other mechanical specialties, has arranged for construction of new plant at Independence, to be occupied under long-term lease. It will be one-story, about 30,000 sq ft floor space. Cost reported close to $500,000.

Louisville, Ohio—Macomber, Inc., 1925 Tenth St., N.E., Canton, Ohio, fabricated structural steel and other steel products, plans new branch plant at Louisville, where tract of about 50 acres of land has been secured. It will comprise two main production units and several auxiliary structures. Cost reported close to $1,000,000.

Charleston, S. C.—West Virginia Pulp & Paper Co., kraft paper, container and liner board, etc., has authorized a large expansion program at local pulp and paper mill, with installation of a new paper-making machine and auxiliary equipment. A number of new one- and multi-story buildings will be provided for pulp divison and paper-making department. Entire project reported to cost over $10,000,000, and will require about 24 months for completion. Main offices are at 230 Park Ave., New York, N. Y.

Rapid City, S. Dak.—Great Plains Refinery & Development Co., Rapid City, is projecting plans for a new oil refinery on local site, comprising a series of one- and multi-story buildings, with processing and other equipment for heavy output, including gasoline division. Cost reported over $2,500,000.

Pettus, Tex.—Danaho Refining Co., 3402 Kirby St., Houston, Tex., refined petroleum products, gasoline, etc., has authorized an expansion and modernization program at oil refinery at Pettus, to be carried out over a period of several months. Additional equipment will be installed for production of fuel oil, gasoline and other petroleum products. Entire program will represent an investment of about $2,500,000.

San Antonio, Tex.—American Lithium Chemicals, Inc., subsidiary of American Potash & Chemical Corp., Los Angeles, Calif., will construct and operate a plant near San Antonio, for manufacture of lithium hydroxide and other lithium chemicals. Plant will comprise a number of one- and multi-story buildings, with processing and other machinery for large output. Cost reported over $4,000,000. Work is scheduled to begin soon.

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USES MECHANICAL SHAFT SEALS—NO STUFFING BOXES. Single positive acting, shaft seals prevent leakage of liquid from pump. No more down-time for repacking stuffing boxes. Seals are of standard design easily available from commercial sources.

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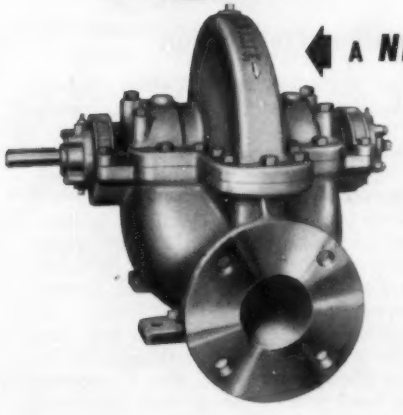

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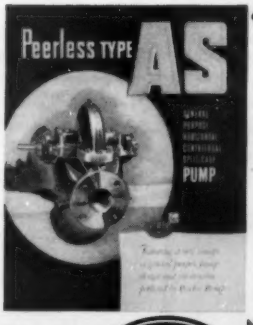

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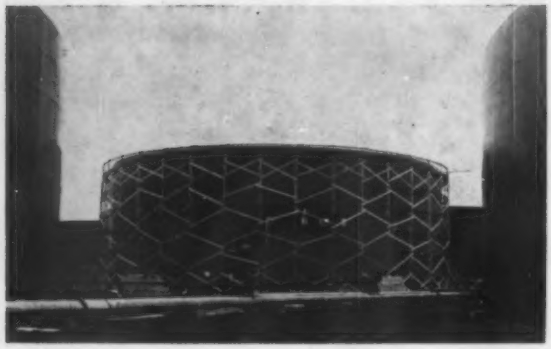
Glass Block Insulation Cuts Steam Cost for Heating Oil in Storage

FACED WITH A DECREASED SUPPLY of waste steam needed to heat heavy fuel oil, the Fuel Oil Corporation of River Rouge, Michigan undertook to insulate four of their huge storage tanks. With the insulation, the required 120 F temperature could be maintained in the storage tanks without excessive steam demand.



Over 50,000 sq ft of Foamglas cellular glass insulation, manufactured by the Pittsburgh Corning Corp., Pittsburgh, was applied to the four tanks, the largest of which measures 117 ft in diameter and 41 ft 10 in. in height.

Foamglas was specified as the insulation because of its resistance to moisture (which often penetrates into insulalation or collects between fibers, destroying its value). Its resistance to acids and their fumes was an important factor, since the tanks are located in a heavily built-up industrial area.

The 2-in. thick blocks of insulation were banded in place on the tank. They were then sprayed with a coat of asphalt cutback. Asphalt-impregnated glass fabric was imbedded in this coat, and another layer of asphalt cutback sprayed on.

Container Manufacturer "Chisels" Costs with Lift Truck Chisel Plate

EMPLOYED BY the National Container Corp., a lift truck featuring a chisel plate attachment speedily removes rolls of paper from rail cars and transports them to storage. Occasionally, it is used to tier and detier rolls in the storage areas.

Use of the chisel plate to store kraft rolls on end instead of on the side increased boxcar loads from 21 to 40 tons, effecting a considerable savings in freight rates. With a Clark lift truck, equipped with the chisel plate, one man can unload 40 tons of paper in 45 minutes, a job which formerly required three men and two hours to complete, using a truck equipped with standard forks.

Tiering of the rolls in storage increased storage capacity by approximately 40 per cent, and roll damage has been virtually eliminated since the chisel has been in use.

Parts Ride Conveyor Through Tunnel for Porcelain Enameling Preparation

STEEL BODIES, TOPS AND OTHER PARTS for clothes washers and dryers are taking acid shower baths in an automatic spray pickling machine at the Hotpoint Co. plant in Chicago.

Tunnel-shaped, the 175-ft long machine automatically conveys unfinished parts through a series of compartments where pressure sprays of alkaline, acid and nickel sulphate solutions clean the metal surface to prepare it for porcelain enameling.

An endless conveyor made of rubber-covered steel cables moves the parts through the machine, which is rubber-lined to protect it from corrosion.

Engineered and built by the B. F. Goodrich Co., in association with Edward Curran Ltd., Wales, the new machine is a larger version of one already installed at Hotpoint.

As the parts move through the machine, a hot alkaline jet spray first removes any foreign surface material. A spray of sulphuric acid then removes rust and scale and etches the surface to improve porcelain adhesion. A deposit of nickel is sprayed on the parts, also to improve porcelain adhesion. Sandwiched between these operations are hot and cold rinses. A final spray of alkaline neutralizer leaves the metal rustproof for enameling.

The machine is fume-free, with the acid section located in the center of the machine, isolated by fresh water rinse curtains. Because of the fume control, the machine may be installed in any part of a plant. Machines of the Goodrich-Curran type are processing bath tubs, panels for stoves, light reflectors, copper rod and steel sheets.

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DIAPHRAGM VALVES FOR STEAM AND LIQUIDS

V-103 N.O. Globe Valve. ½" to 8" sizes. *Send for Bulletin V-103.*

V-153 Sylphon Diaphragm Valve for low pressure steam. Sizes ½" and ¾". *Send for Bulletin V-153.*

V-111 Sylphon Radiator Valve for low pressure steam. Sizes ½" to 2". *Send for Bulletin V-111.*

V-105 N.C. Globe Valve with V-510 Pilot Positioner. *Send for Bulletins V-105 and V-510.*

MASTER-SUBMASTER CONTROL FOR STEAM, LIQUIDS OR AIR

T-900 Remote Bulb Master Thermostat. *Send for Bulletin T-900.*

T-901 Remote Bulb Submaster Thermostat. *Send for Bulletin T-901.*

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T-403 Single Temperature Thermostat. *Send for Bulletin T-403.*

T-460 *Dual* Two-Temperature Thermostat. *Send for Bulletin T-460.*

Series T-800 Thermostats for steam, liquids or air. Proportional or two-position action. Furnished with remote bulb for liquids or air; rigid stem models for insertion or immersion. Separable sockets available. *Send for Bulletin T-800.*

V-108 THREE-WAY MIXING VALVE for mixing liquids of varying temperatures. Thermostatically controlled. Sizes 2½" to 10". Rubber diaphragm. *Send for Bulletin V-108.*

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PROCESS CONTROL. Automatic temperature and humidity control for a wide range of manufacturing and industrial process applications. Thermostats, special controllers, valves and dampers applied to tanks, dryers, vats, kettles, curing rooms, coolers, kilns, ovens and other processing equipment.

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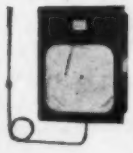

T-1000 RECORD-O-STAT. Records and controls. Built for extreme accuracy under all conditions. Single and two-pen models. Liquid-filled, vapor tension or gas-filled thermal systems. For ranges between minus 125°F. and plus 1000°F. Charts for 24 hours or 7 days. *Send for Bulletin T-1000.*

T-1050 INDICATING CONTROLLER For use where no permanent record is required. Easy-to-read scale permits accurate check of the controlled variable. Same measuring and control features as Record-O-Stats. *Send for Bulletin T-1000.*

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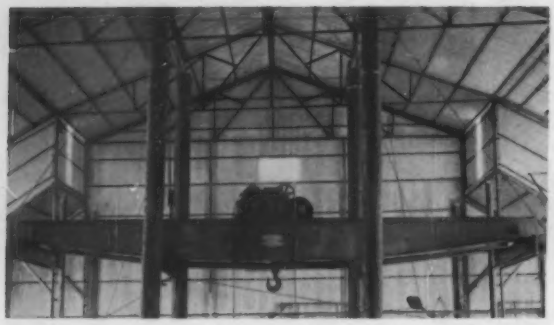
Big Lift Puts Big Crane in Position in Tank Fabricating Plant



ORIGINALLY RATED at 40 tons capacity, but redesigned and reinforced to carry 80 tons, an overhead crane has been installed in the new tank department of the Master Tank & Welding Co., Dallas, Texas.

To accomplish the job of installation, four pipe columns were fabricated, each 22 in. in diameter and 40 ft in length. Placed on end inside the building, each pair of pipe columns had a 24-in. I-beam welded across the top, joining them to form a rigid structure.

A block and tackle, with eight ¾-in. lines, was suspended under each I-beam. To hoist the crane bridge into place (a lift which exceeded 30 tons), the combined weight and power of two large truck winches and two Caterpillar tractors was used.

Rubber Roadway at Railroad Crossing—Cue for Industrial Trackage

FIRST OF ITS KIND, a rubber railroad crossing has been installed on the main track of the Erie Railroad in Akron, Ohio. Material for the crossing roadway was supplied by the Goodyear Tire & Rubber Company.

The rubber vehicular roadway between the tracks is built with slabs of rubber measuring 36 in. wide by 59 in. long, and about 3 in. thick, including a sheet of heavy gage steel sandwiched within each slab. It rests on heavy treated wood risers, laid on top of each regular railroad tie and each slab is fastened down by lag screws 12 in. long, installed through metal and rubber grommets.

Tapered flanges on the slabs, where they meet the rails, form a watertight wedge to the rail, preventing seepage which causes deterioration of ties and fouls ballast in the crossing.

Smaller rubber slabs were used outside of the rails, extending to the tie ends of the track and these, too, form a watertight union with the rails. The completely installed crossing presents a smooth resilient surface.

Fully Automatic Grinder Goes to Work on Automobile Crankshafts

BELIEVED TO BE A "FIRST," an automated crankpin grinder has been built by Norton Company of Worcester, Mass., for installation at the Utica, Michigan, plant of the Studebaker-Packard Corp.

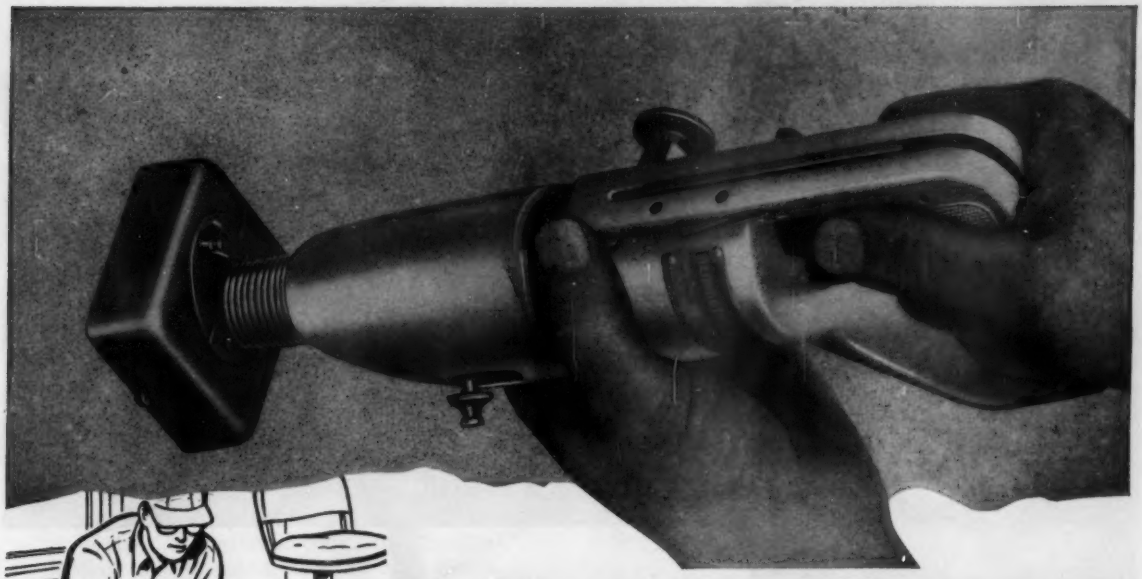
Known as the Transfer Type Crankpin Grinder, the machine will pick up a crankshaft from a conveyor line, automatically locate the work in four successive grinding stations where the crankpins are ground to close tolerance limits, and place the finished work on a conveyor to be carried to the next operation, "untouched by human hand."

Five transfer heads operate simultaneously, taking an unground shaft from the loading station to the first grinding station for grinding pin number one; a crank from the first to the second grinding station for grinding pin number two; a crank from the second to the third grinding station for grinding pin number three; a crank from the third to the fourth grinding station for grinding pin number four; and a finished crankshaft from station number four to the unloading station back on the conveyor line.

For grinding V-8 shafts with four pins, two base units, each mounting two grinding wheel slides are required. A transfer unit is mounted over the four grinding stations. Cabinets for hydraulic and electric controls are located behind the machine for easy maintenance.

Grinding wheel life expectancy has been improved by two factors: (1) Automatic wheel truing at every work cycle, or at any pre-set number of cycles, eliminates the human element in truing which tends to remove too much of the wheel surface in the truing operation. (2) The rigid, cartridge-type bearings which support the grinding wheel spindle at each end have proven beneficial to wheel life in other installations.

Air operated gages measure the pin diameter during grinding and control the in-feed of the grinding wheel, and lubrication of the machine is accomplished automatically through a built-in lubrication system.



Anchoring seats, bar stools to concrete

2" x 4" plates to concrete floor

Carpet gripper anchored to concrete

REMINGTON STUD DRIVER

saves up to 80% fastening costs on "special" jobs

When it's an unusual fastening job that has to be done quickly, efficiently—let the Remington Stud Driver take over. There are special guards, interchangeable with the standard guard, that adapt it for practically any application. And the Stud Driver's cartridge-powered action enables one man to set up to 5 studs a minute—a saving in time and labor of approximately 80% over old-style methods.

Setup time is cut to a minimum with the Stud Driver. There are no holes to drill; no laborious hammering is necessary. A squeeze of the trigger and the tool's powerful cartridge drives the stud home—solidly and permanently into steel or concrete. Compact and portable, the Stud Driver has a field of use limited only by where a man can go.

DISCOVER FOR YOURSELF how this lightweight (6 lbs.) fastening tool can cut costs for you. Let us send you our new booklet which shows how the Remington Stud Driver anchors furring strips, structural channels and many other fabricated materials to concrete or steel. Just clip and mail the coupon for your free copy.

"If It's Remington—It's Right!"

Remington DUPONT

Listed & Approved by Underwriters' Laboratories, Inc.

MAIL THIS COUPON TODAY

Industrial Sales Div., Dept. PE1
Remington Arms Co., Inc.
Bridgeport 2, Connecticut

Please send me a free copy of the new booklet showing how I can cut my fastening costs.

*Name*_____

*Position*_____

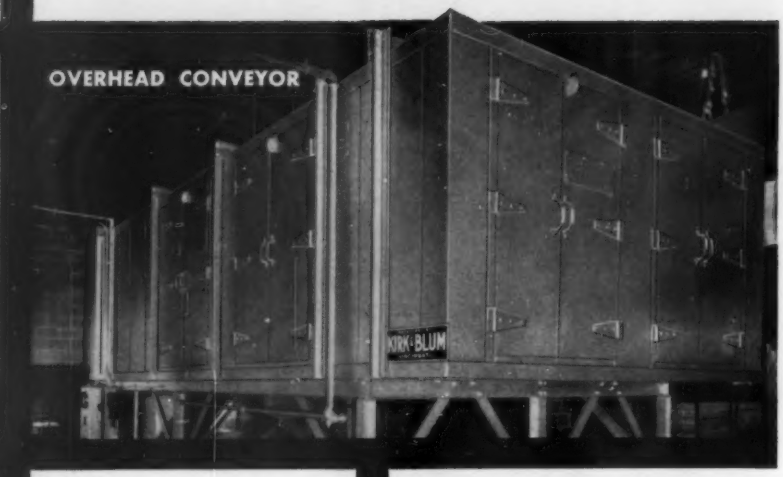
*Firm*_____

*Address*_____

*City*_____ *State*_____

For more facts circle 571 on Reply Card

BELT CONVEYOR



TRAY

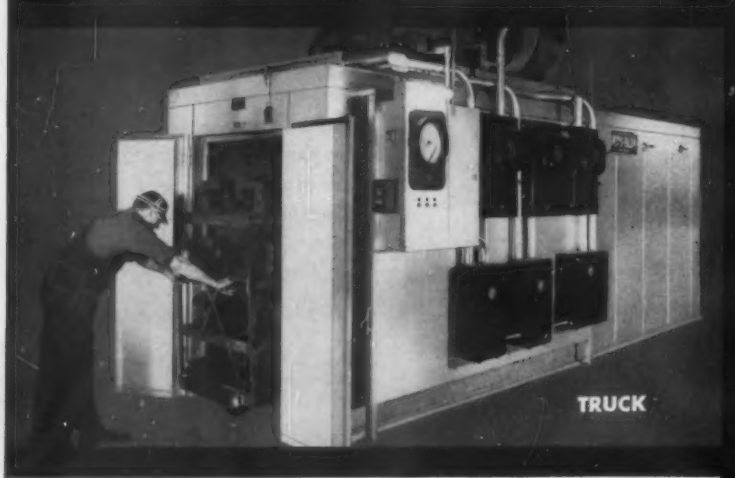
what type OVEN do you need?

KIRK AND BLUM INDUSTRIAL OVENS

Your oven needs . . . large or small, batch or conveyorized production, for drying, baking or dehydrating . . . can be filled by KIRK & BLUM.

Compactly designed and expertly engineered to meet specific requirements, these typical installations show the wide range of KIRK & BLUM experience over more than 47 years. Often, ovens up to freight car size are shipped assembled, ready to operate.

Put this skill and experience to work on your industrial oven problem. For complete information and booklet, write: The Kirk & Blum Mfg. Co., 3189 Forrer St., Cincinnati 9, Ohio.

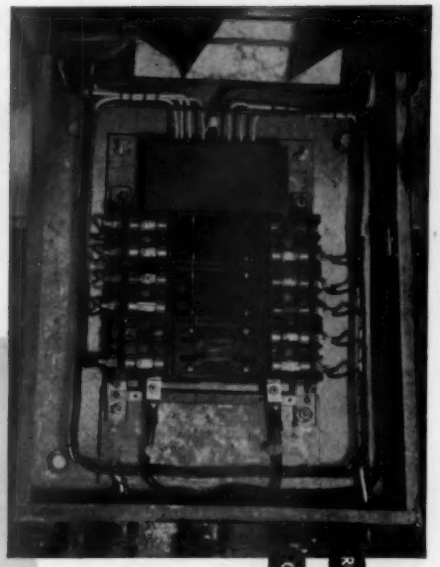


TRUCK

KIRK AND BLUM
INDUSTRIAL OVENS

For more facts circle 572 on Reply Card

How a Texas chemical company solved a tough cable requirement

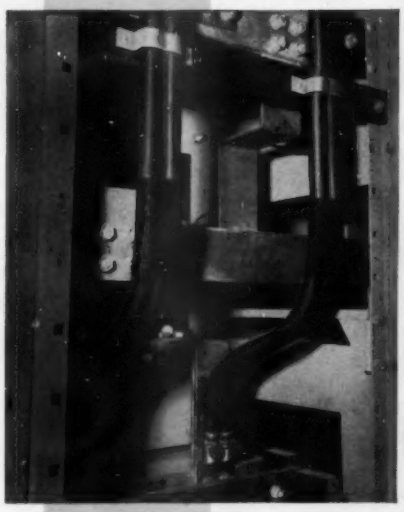


High ambient temperatures, together with corrosive fumes from acids and caustics, may cause cables to disintegrate within a few months... unless you've specified the correct insulation.

That is one of the reasons why a large Texas chemical company specified Rome Synthinol® 901 insulated wire and cable for plant wiring. This special compounded polyvinyl chloride insulation provides *exceptional resistance* to acids, oils, corrosive fumes, greases, moisture, and heat deformation for most applications through 600 volts.

Its performance has been so good that it is now one of the most frequently specified cable insulations for chemical plants, oil refineries, paper mills, steel mills and similar industrial plants. Ask your purchasing department to check this.

You will save time and money on the installation of Rome Synthinol 901. It is uniform in diameter and easy to pull. Permanent color coding helps to identify circuits quickly.



Rome Synthinol 901 Insulated Wire Approvals

Appliance Lead Wire—Underwriters approved for 600 v. at 90°C. through size No. 4/0 AWG. Approved for 105°C. on smaller sizes No. 24 through No. 16 AWG.

Type TW—Underwriters approved as Type TW for 60°C. operation, under the National Electric Code. High resistance to heat means greater safety factor at elevated temperatures.

Machine Tool and Control Wire—Underwriters approved as Type TW, with end use approval for 90°C. operation in air; 60°C. where exposed to oil and in wet locations. Conforms with National Machine Tool Builders' Association standards. Resistant to extreme ambient temperatures, acids, oils, cutting solvents and flame.

It Costs Less to Buy the Best

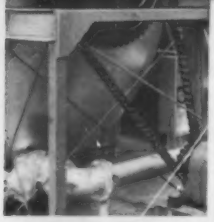
ROME CABLE Corporation
ROME • NEW YORK
and
TORRANCE • CALIFORNIA

ROME CABLE CORPORATION, Dept. PE-1, Rome, N. Y.
Please send information on Rome Synthinol and Rome Synthinol 901

Name.....
Company.....
Address.....
City..... Zone..... State.....

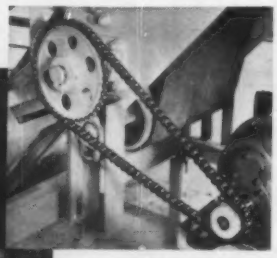
For more facts circle 573 on Reply Card

Are Your Drive Centers Long, Short or Medium?

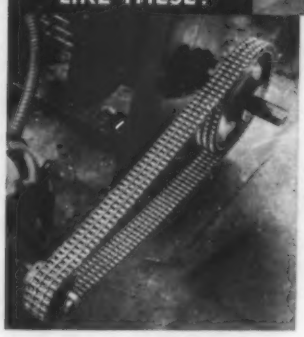


LONG CENTERS LIKE THESE?

At Top: Long distance between centers and with idler sprocket, drive gets around obstructions.
At Left: Single No. 478 Diamond Roller Chain agitator drive on 5-foot center.



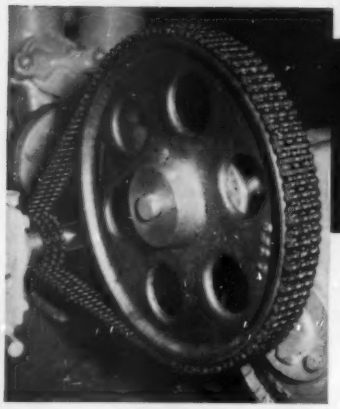
OR MEDIUM CENTERED DISTANCES LIKE THESE?



Above: Drive to carton conveyor, 28-inch center distance.
At Left: Multiple-strand high speed motor drive.

Write for complete data Catalog 754.

DIAMOND
ROLLER CHAINS
Provide Equally Positive Drives Regardless of Center Distances



OR CENTERS SO SHORT SPROCKET TEETH BARELY CLEAR?

Short center high-speed motor drive — triple-strand Diamond Roller Chain.

■ Whether shafts are very close together or far apart—Diamond Roller Chain Drives transmit the power positively—without slip or drag.

Speeds selected or desired are accurately assured—productive output maintained at maximum, every hour of every day.

Diamond high-finish Roller Chains perform as smoothly as they look—every roller perfectly mated, cushioned in movement on films of oil. Little or no power is absorbed, with little maintenance throughout long years of useful life. Delays and replacements are avoided when you entrust your motor and machinery drives to Diamond Roller Chains.

Practical recommendations and a copy of new Catalog 754 are yours for the asking.

SHOT-PEENING SINCE 1944

Diamond Chain has long recognized that certain types of internal stressing of chain parts would increase fatigue resistance. To this end, link plates have been specially processed and chain rollers and other parts have been shot-peened since 1944.

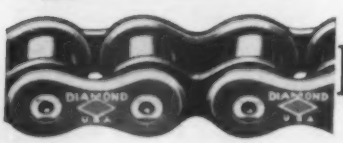
DIAMOND CHAIN COMPANY, Inc.

Where High Quality is Traditional

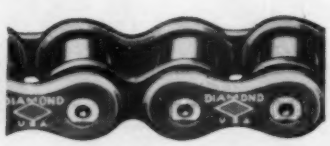
Dept. 614, 402 Kentucky Ave., Indianapolis 7, Indiana

Offices and Distributors in All Principal Cities

Please refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER



DIAMOND ROLLER CHAINS



For more facts circle 574 on Reply Card

SIX INDUSTRIAL PUMPING PROBLEMS Solved by the MOYNO® Pump!

Looking for a pump with a fast-growing reputation for solving tough pumping problems? Then take a look at the simple, versatile Moyno!

Briefly described here are a few of the many successful case histories proving how Moynos handle jobs where other pumps fail. Why is the Moyno a "problem-solving" pump? For one thing, because it differs completely from conventional pumps . . . rotary, centrifugal or piston. Just one rugged moving part—a rotor turning within a stator—does the job.

The list of materials handled by Moyno Pumps gets longer every day. If *you* have a pumping problem, such as handling abrasive slurries, mild acids, caustics, materials that are watery, viscous or even semi-solid—find out if the Moyno can help you! Use the coupon below for prompt, complete information.

1 Material: Chromic Acid.
Problem: Material hard on pumps—being slightly corrosive and abrasive.
Solution: Moyno pump on duty for the past two years; has required practically no maintenance. Customer very well pleased.

2 Material: Quarried Clay.
Problem: 40 to 60% loss of clay slurry.
Solution: Moyno pump in use for the past 2 years has reduced above production losses to average of less than 5%.

3 Material: Calcium Carbonate Slurry.
Problem: Continuous failures of centrifugal pumps.
Solution: Moyno pump still giving perfect service after 1½ years of 24-hour-per-day operation.

4 Material: Special Navy Paint Mixture.
Problem: Low volume of gear-type pump; necessity for pre-heating paint before pumping into tank cars.
Solution: Moyno cut tank car filling time from 10 hours to 2½ hours. No need to pre-heat paint. No maintenance costs since Moyno was installed 2 years ago!

5 Material: Caustic Solution—for use in mercerizing machines.
Problem: Rotary pumps wore quickly, lost capacity, and had too little suction.
Solution: Moyno pumps cut maintenance and repairs to minimum—had ample suction for drawing caustic through the cloth.

6 Material: Anti-Scale Boiler Treatment (alcohols, oils, anti-foam agents, sludge conditioners).
Problem: Frequent pump breakdowns caused by back pressure of 5 spray nozzles.
Solution: Moyno pumps cut pumping time from 20 minutes to 3 minutes and also reduced down time. Both helped to increase production 200%!

FEATURES OF THE MOYNO THAT MAY SOLVE YOUR PUMPING PROBLEM

Positive Displacement—Moynos are available to pull up to 29" vacuum while discharging under pressure. Big Moynos deliver up to 250 g.p.m. at pressures to 600 p.s.i.

Versatile—Handles liquids, slurries, pastes, even semi-solids. Rotor and stator available in stainless steel, other alloys, or plastics, to meet wide variety of applications.

Gentle—No churning; won't break up semi-solids; won't aerate liquids. It even pumps potato salad!

Reversible—Pumps with equal efficiency in either direction.

Trouble-Free—Self-priming; won't cavitate or vapor-lock. Just one moving part—no valves to stick, no pistons to gum up. Built for tough service. Easy to maintain.

ROBBINS & MYERS, INC.

SPRINGFIELD 99, OHIO • BRANTFORD, ONTARIO

Fractional & Integral h.p. Motors & Generators

Electric Fans

Electric & Hand Hoists & Cranes

Moyno Pumps

Propellair Industrial Ventilating Equipment

Robbins & Myers, Inc.
Pump Division, Springfield 99, Ohio PE

Gentlemen: Please mail free copy of Bulletin 30-B containing details on Moyno Pumps.

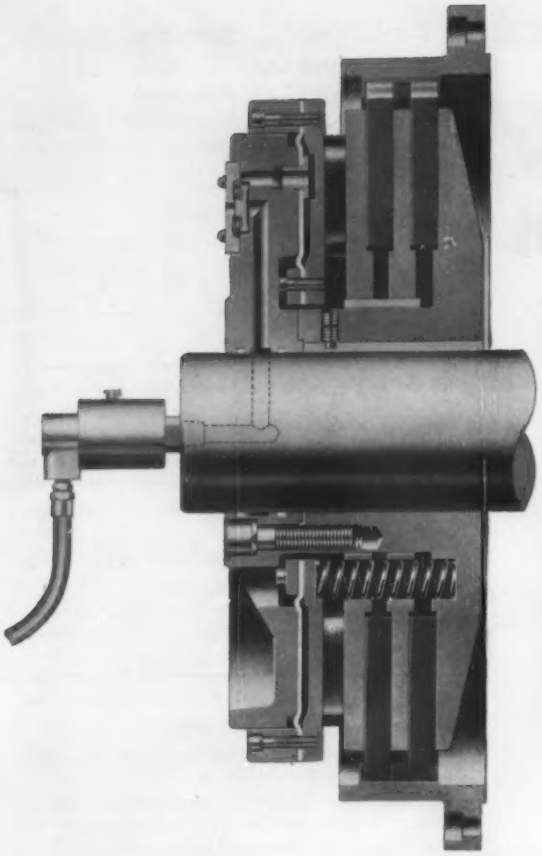
Name _____ Title _____

Company _____

Address _____

City _____ State _____

For more facts circle 575 on Reply Card



DODGE AIR-GRIP CLUTCH

Announcing a NEW Air Clutch with Amazing Sensitivity . . . Cooler Operation . . . Extreme Compactness . . . Built-in Quick Release Valves

Finger tips on the throttle bring instant response, give the operator split-second control. This new product of Dodge is the quickest-acting air clutch available!

New design and engineering by Dodge achieve this exceptional control—in a clutch that provides maximum torque capacity in minimum space. Less air is used to operate the clutch—the result is a new sensitivity that enables the operator to "inch" the clutch, or to throw it into full engagement as required. Where instant disengagement is needed, quick release valves are built into the clutch itself, as optional equipment.

The unique design of the Air-Grip Clutch places the air seal disc at the end *farthest* from the pressure plates, which generate the heat inherent in clutch operation. This, combined with automatic internal ventilation, insures cooler operation and longer life under severest service. Provision is made for mechanical engagement of the clutch if the air supply should fail.

Thorough tests in the field as well as in the laboratory assure you of Dodge dependability in the Air-Grip Clutch. Available in sizes from 8.5 to 460 hp at 100 rpm at 80 psi. Call your local Dodge Distributor or write for Bulletin A634.

DODGE MANUFACTURING CORPORATION
2700 UNION STREET, MISHAWAKA, INDIANA

DODGE
of Mishawaka, Ind.

Sixty years of experience in serving industry's clutch needs . . . manufacturer of the famous Dodge Diamond D and Rolling Grip mechanical clutches.

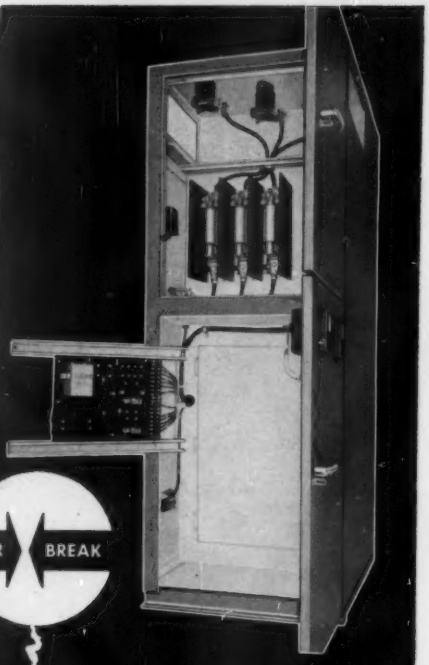
Call the Transmissioneer, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

For more facts circle 576 on Reply Card

AN EASY WAY TO SELECT HIGH INTERRUPTING CAPACITY STARTERS

50,000 KVA*	POWER FUSES		VALIMITOR	
2200-5000 volts	2300 Volts	4800 Volts	2300 Volts	4800 Volts
	150,000 kva	250,000 kva	unlimited kva bus	

* Certified



On Air-Break ZHA Starter, overload relay panel swings out. Opening of inner door gives access to motor terminals and rear of contactor.

YOUR BEST BUY FOR SHORT CIRCUIT PROTECTION

EC&M (2200-5000 VOLT) MOTOR STARTERS

EC&M Oil-Break Starter of VALIMITOR type has ZHS, 50,000 KVA Contactor mounted under oil in rear tank.

No matter how you figure it . . . high voltage motor starters, with adequate interrupting capacity, are your best investment.

Should a fault occur, vital drives are protected by clearing the circuit quickly. The need for extensive repairs or replacements has been minimized. Down-time is reduced. This results in lower costs.

Although short circuit values get greater as KVA capacities grow, EC&M's complete line of Motor Starters provides a wide range of selection to cover any requirement. They are available in Oil and Air-Break styles having interrupting capacity ratings shown above . . . note there are 3 ratings in both oil and air break.

The ceiling on the short circuit problem has been lifted. Be sure you have the information on this wide choice of EC&M Motor Starters for 2200-5000 volt motors.

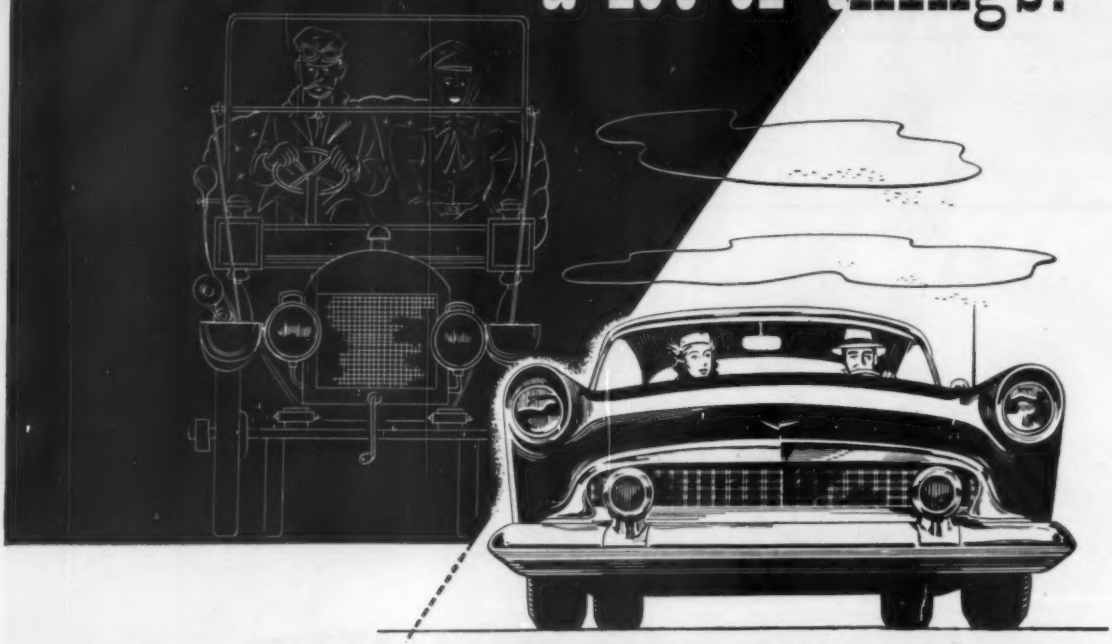
Write for handy new catalog 6062 showing complete coverage of 2200-5000 volt motors.

THE ELECTRIC CONTROLLER & MFG. CO.
2698 East 79th Street
Cleveland 4, Ohio

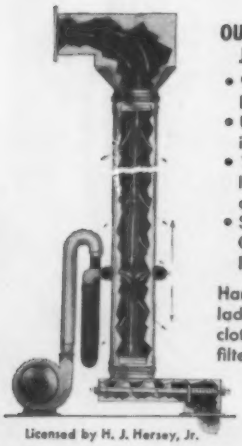
6072

For more facts circle 577 on Reply Card

50 Years have changed a lot of things!



...including DUST CONTROL



Licensed by H. J. Hersey, Jr.

Diagram of operating design of filter tube.
(Available in multiples of 4, 8, 12, 16 and 32 tubes)

OUTSTANDING DAY REVERSE JET FILTER ADVANTAGES

- 99.99+% Filtering Efficiency
- Up to 5 Times Higher Filtering Rates
- 100 per cent of Equipment Investment Is in Operation at All Times
- Smaller Size with Higher Capacity Saves Valuable Plant Space

Handles 5 times more dust laden air per square foot of cloth than conventional dust filters.

The automobile has changed America's living habits and the DAY High Pressure Reverse Jet Filter has changed American industries' dust control methods. To match the challenge of changing times and changing needs DAY leadership revolutionized the control of dust by utilizing the Hersey principle of filter cloth cleaning with HIGH PRESSURE REVERSE JET AIR. This advanced type of filter handles FIVE TIMES MORE DUST LADEN AIR per square foot of filter cloth than conventional filters. This is the most important improvement in dust filtering in 50 years.

Modern manufacturing methods demand modern dust control methods. There is nothing that will match the high on-the-job efficiency provided by DAY filters. It is a proven fact that one DAY filter recommends another. DAY High Pressure Reverse Jet filtering has been used by leading companies for more than 5 years. 87% of DAY filter users have ordered additional DAY Reverse Jet Filters. For maximum filtering results from a minimum filter investment write for complete facts. DAY gives you tremendous savings in valuable plant space, installation and maintenance costs.

Write toDAY for FREE Bulletin 528-R, about America's most advanced dust filter.

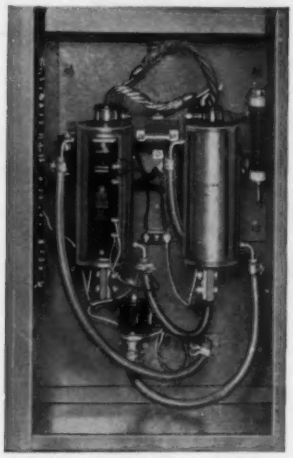
DAY
SINCE 1881

The DAY Company

807 Third Ave. N. E. • Minneapolis, Minnesota
IN CANADA: P.O. Box 70G, Ft. William, Ontario
Branch Plants: Buffalo, Ft. Worth and Toronto, Ontario
Representatives in Principal Cities

STOP **AIR POLLUTION with DAY DUST CONTROL**

For more facts circle 578 on Reply Card



Often a single G-E Temperature-controlled Ignitron will also control operation of one or more standard ignitrons.

AT NEW LOW PRICES G-E WELDING IGNITRONS GIVE YOU TWO CONTROL FEATURES FOR COST OF ONE!

1. **Over-temperature control that's fast, sure, precise . . . prevents costly tube burnouts.**
2. **Cooling-water control that will save 95% water . . . up to 1,000,000 gallons a 3-shift day.**

CHECK new low G-E prices at right! Other temperature-controlled ignitrons at these prices include no water-control feature! Means you lose out on that important operating economy—a big saving in dollars, if you buy cooling water.

If you draw from your own wells, General Electric's 95% reduction in water safeguards you against dry-season shortages. Your welders can operate every working day in the year, no matter what the sub-surface water level.

Furthermore . . . only G.E. brings you controls that are part of the tube itself, with sealed-in life adjustment! Ask your G-E tube distributor why G-E Ignitrons (1) mean more and better performance for your money, (2) give you temperature-controlled tubes that are built in *one integrated unit* by one manufacturer, carrying full G-E warranty throughout! *Tube Department, General Electric Company, Schenectady 5, New York.*

GENERAL ELECTRIC TEMPERATURE-CONTROLLED WELDING IGNITRONS

GL-6346.
Size B, replacing GL-5551/FG-271.
$77.75

GL-6347.
Size C, replacing GL-5552/FG-235-A.
$115.75

GL-6348.
Size D, replacing GL-5553/FG-258-A.
$245.75

Progress Is Our Most Important Product

GENERAL ELECTRIC

161-181

For more facts circle 579 on Reply Card

NEW PRODUCTS AND PROCESSES summarized for your convenience

Edited by M. E. Heniken

1—SWITCH with interlocking, non-interlocking features

Designed to combine both interlocking and non-interlocking switch features in one unit, the Type SCSD Standard Duty Closed Shutlbrak Switch is suggested for motor control, service entrance or any job requiring a standard duty operating switch. Its features are announced as including quick-make and quick-break operation with interlock on full opening, hinged cover, quick conversion to non-interlocking operation by manually shifting a simple mechanism inside the door, and "on" and "off" indication in cover. It is pointed out that a special release is provided for access in "on" position by authorized person. The units are available in these capacities: 30 to 200 amp; 250 and 600 v a-c or d-c; two, three and four poles single throw. Frank Adam Electric Co.

2—POWER VENTILATOR features new design

The extreme low silhouette of the Lo-Sil Vent is reported to afford functional beauty yet maintain high operating efficiency. It is available in 31 capacity sizes varying from 225 cfm to 17600 cfm, with static pressures to 5/8 in. Motor is mounted on special vibration separators. Hood is hinged and secured by two heavy duty draw buckles for easy inspection. Material used in Lo-Sil vents is heavy gage steel, electric welded and finished with two coats of paint. Motors are totally enclosed, available for single or three phase current. Single phase motors are capacitor type for variable speed operation. Muckle Mfg. Co.

More information on any of these products can be yours without cost or obligation. Just circle the item numbers on the Reader Service Cards provided on pages 169-170.

4—PROTECTIVE COATINGS for metal and concrete

This line of Neoprene based coatings consists of Neobon, an on-the-job mixed heavy rubber coating; Nelium, a high solids high built liquid Neoprene coating; a caulking material and Elprene, a liquid Neoprene maintenance coating. These products which are available in gray and black can be applied to metal or concrete surfaces over a Neobon priming system. Neobon or Elprene may be applied by brush, roller coater or spray gun. The Atlas Mineral Products Co.

5—PILOT PLANTS offered as packaged units

Announced for use in processing industries, these reaction-distillation pilot plants ranging from 5 to 60 gal capacities come in packaged unts consisting of reactor, condenser, receiver, decanter, piping valves and instruments. Small reactors, designed for flexibility and convenience, are also offered. All units have been field tested. In addition to cost savings and correct design features, the "off-the-shelf" pilot plant designs also are time-savers in research projects. The Patterson-Kelley Co., Inc.

6—TUBE GAGE measures inside diameters to 0.001 in.

This is announced as a simple but accurate gage for measuring inside diameters of small tubes and tube sheet openings in condensers and heat exchangers. Designed primarily for use in conjunction with tube rolling operations, the gage

features a large dial with graduations. It can be read directly in thousandths of an inch.

The gage measures by means of three hardened steel balls protruding from a hollow steel barrel giving the three-point contact. These balls are supported by a spring-loaded, tapered mandrel that moves inside the barrel. To use the gage, the mandrel is partially withdrawn by pulling out the knob to let the balls recede into the barrel. The gage is then inserted in the tube and the mandrel slowly released. Lagonda Div., Elliott Co.

7—PALLET-CONTAINER is a light, collapsible unit

Of interest to plant engineers is a collapsible airborne pallet-container being offered air cargo operators for speeding plane loading and cutting down tare weight. The new container, manufactured by Hart Metal Products Corp., is a prototype of one designed by Kaiser

Aluminum & Chemical Corp. for the U. S. Air Force. The pallet weighs 65 lb—is designed to carry a working load of 800 lb—and is 40 in. wide and high, 48 in. long. It is made of aluminum alloy.

This pallet (shown collapsed) can be assembled or taken apart quickly without tools or loose fasteners, it is reported; and it has a one-to-five assembled-to-collapsed density ratio to take up a minimum space when being returned empty or stored. Each pallet is composed of six corrugated aluminum panels —top, bottom, and sides—and each panel is framed with extruded channels which enclose the sheet and are stapled to it.

3—DUCT FURNACES are easy to install, have many uses

Sectional assembly to simplify installation is the outstanding feature of a series of large capacity duct furnaces. According to manufacturer, these units enable installation of custom engineered heating systems with total capacities of 2,000,000 Btu and above from sections weighing no more than 315 lb. The series includes sizes ranging upward in steps of 50,000 Btu input from 150,000 to several million Btu. The illustration shows a 150,000 Btu and a 300,000 Btu unit side-by-side, with tubes in place for either a suspended or base-mounted installation. A second duct furnace series (not illustrated) includes four small capacity units from 50,000 to 125,000 Btu.

Actually compact heat exchangers, each unit has a full complement of combustion controls. Other components — for air moving, cooling, cleaning, and humidification and temperature control — are selected to meet requirements of the installation. This, it is pointed out, provides a system of maximum efficiency at lowest cost. Duct furnaces can also be booster units in long duct runs.

Designed for installation as an integral part of the duct system itself, all units may be suspended or base mounted. Because air flow through the heater may be in either direction, the units can be mounted in the duct so as to provide easy access to controls and burners. All have built-in draft diverters. Aluminized steel heat exchangers, cast iron burners are standard. Reznor Mfg. Co.

X-thousand chances to be wrong...or right!

It's here when piping is in the blueprint stage that both original costs and operating costs are determined.

Make the wrong choice—an inferior valve—for just one location and it may mean only a *little extra* maintenance later on. But if "wrong" valves are specified at a dozen, a score—or more—locations, the *added* cost for excessive maintenance can become hard to take . . . especially when many a valve failure can disrupt an entire plant operation.

You can avoid trouble and wastefully high maintenance by discerning purchase of valves and fittings of greater suitability, greater dependability. Quality becomes the important specification. That's why it's thrifty buying to depend on the consistent quality of the broad Crane line.

Crane Co., *General Offices: 836 S. Michigan Ave., Chicago 5, Ill. Branches and Wholesalers Serving All Industrial Areas.*

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VALVES • FITTINGS • PIPE • PLUMBING • HEATING

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He also knows . . .

—that ALGRIP's depth-controlled abrasive penetration of its rolled steel base . . . assuring a safety surface self-renewed against the hardest wear . . . means greater . . . constant . . . and lasting . . . safety of your workers' lives.

—that ALGRIP is approved for safety by the Underwriters' Laboratories.

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Other products: A.W. SUPER-DIAMOND Rolled Steel Floor Plate—Plates—Sheets—Strip—(Alloy and Special Grades)

For more facts circle 668 on Reply Card

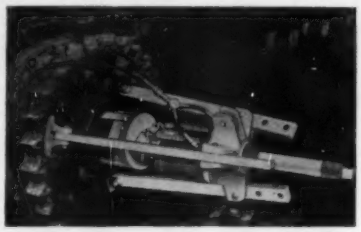
NEW PRODUCTS

(Begins on page 128)

Lips on the channel of adjacent panels mesh together. Top and bottom panels have cleats on the corner to hold the box off the floor for truck entry, act as closures for the ends of the cam hinges, and serve as tie-down eyes. The cleats also permit nesting. A collapsed pallet is less than 10 in. high and subsequent stacking adds about 7¾ in. per pallet. Kaiser Aluminum & Chemical Corp.

8—SPROCKET PULLER is 100-ton, universal type

One of the toughest maintenance jobs on crawler type tractors—pulling and installing the drive sprockets—can be done with substantial savings in time and



labor with the new OTC 100-Ton Sprocket Puller, according to manufacturer. The tool is said to operate equally well on several leading makes of tractors and have power to spare. The puller itself has gripping lugs designed to grip harder automatically as pressure is increased. The 100-ton ram incorporated is company's twin cylinder Power-Twin which is portable and detachable for use with other attachments or presses. Either electrically operated or hand operated pumps may be used to activate the ram. Owatonna Tool Co.

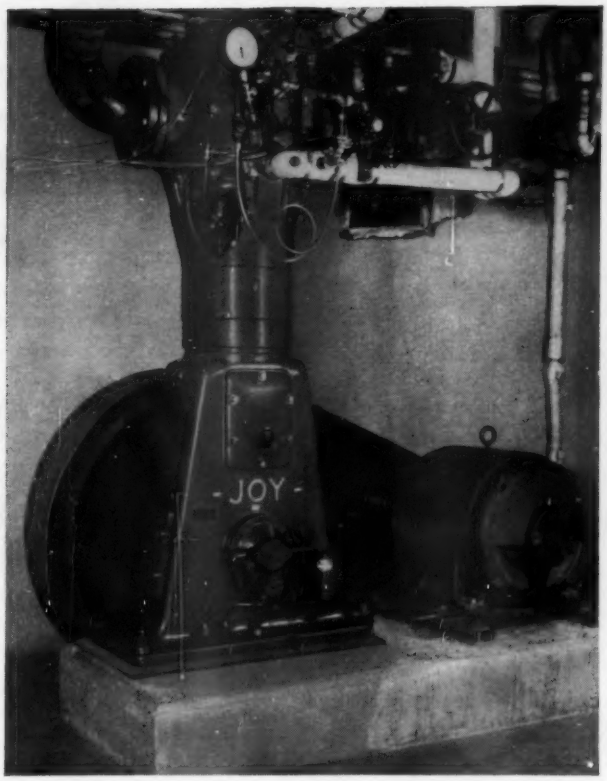
9—SELF LOCKING SCREW to keep faucets from leaking

A self-locking faucet washer screw that cuts repair time and eliminates washer failure caused by faulty installation is announced. With this screw, it isn't necessary to select one exactly the right length to "set" against the bottom of the screw hole, it is pointed out. Ten sizes of these screws, carried in a special metal box, do the job of seven sizes, says manufacturer. The screws are made of corrosion-resisting Monel and have a small nylon plug set into the shank. This plug grips the faucet spindle threads, it is explained, and the screw can't work loose, won't ruin the washer, yet is easily removable. J. A. Sexauer Mfg. Co., Inc.

10—HEAVY OIL BURNER for smaller installations

Designed to offer safety and economy features usually found only in larger burners, the new "3" Hev-E-Oil Burner is suited for installations having a net standing radiation of 3800 sq ft or 35 bhp. According to manufacturer, the capacity

Here's How One Company Gets Oil-Free Compressed Air for Antibiotics



TWO JOY WGO-9 OIL-FREE COMPRESSORS DELIVER THE AIR . . . DRY, CLEAN and WITHOUT A TRACE OF OIL

THIS WAS THE PROBLEM: A large antibiotic manufacturer required oil-free air for sterile finishing operations in the production of penicillin and other antibiotics.

THIS WAS THE ANSWER: A Joy WGO-9 vertical, oil-free compressor was placed in service in 1951. It provided 300 cfm of air at 100 psi, and was operated continuously. The space-saving vertical design allowed a very compact installation. The service was excellent and the operation very economical—so much so that the company added a sister unit in 1953.

THIS IS HOW IT WAS DONE: Joy oil-free compressors are equipped with carbon graphite piston rings. These need no lubrication and compensate automatically for wear. Special lightweight pistons; large, direct air passages; and liberal water-jacketing reduce heat and minimize ring wear. Patented Dual-Cushion valves are made of corrosion-resistant materials. All wearing areas, except rings, are either chrome-plated, surface-hardened, or made of stainless steel.

FREE BULLETIN A-44 TELLS STORY: Joy builds regular and oil-free compressors to meet any capacity and pressure requirement. For your copy of Bulletin A-44, write ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

Consult a Joy Engineer

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Wilshire "SUPER-SAFE"

SERIES 1200

MULTIPURPOSE

POWER SWEEPER

GREATER SAFETY

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BIGGER VALUE

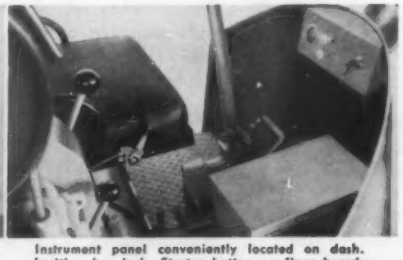
CUT YOUR SWEEPING COSTS 80%

WILSHIRE "Super-Safe" is the safest, most efficient, easiest-to-operate Power Sweeper ever developed. It incorporates every feature demanded by Safety Engineers. Standard automotive shock-absorbing steering, conveniently located instrument panel and all controls at operator's right hand make the "Super-Safe" the easiest sweeper in the world to operate. Operator is fully protected by front steel guard and all moving parts are encased in steel housings for complete protection to the operator as well as to the operating mechanism. The Duplex Power Drive is so efficient that the "Super-Safe" can sweep heavy accumulations of debris up grades of as much as 20%.

Write for illustrated brochure and name of your nearest Wilshire Distributor

All control handles are at operator's right hand. All hazards to hands or clothes are completely eliminated as all moving parts are completely covered.

Standard automotive steering wheel and shock absorbing steering gear. Steel guard protects operator. Easy in-and-out access from left side.



Instrument panel conveniently located on dash. Ignition has lock. Starter button on floor board. Throttle at right of seat.

Dust bag guard behind operator's seat protects him from sagging dust bag. Dust shield in the front eliminates throwing dust into operator's eyes.

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NEW PRODUCTS

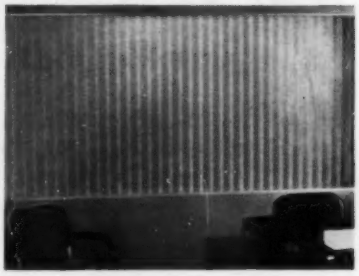
(Begins on page 128)

of this oil burner has been increased 56 per cent so that it is now capable of burning 11 gph, and the greater capacity and efficiency are gained with no increase in power consumption.

Like other burners in company's Hev-E-Oil line, the new "3" is a low pressure air atomizing type with all electric ignition. It is designed to burn low cost No. 4 or 5 heavy oil without preheating. It is a complete package ready for installation with boiler or heating plant. It is fully wired and ready for service connections. An accessible control box houses the electrical controls. It is pointed out that this burner is inexpensive to install since no front plates, secondary air door or checker work hearth is needed, all primary and secondary air is furnished by the burner. Cleaver-Brooks Co.

11—STRUCTURAL PANELS have transverse corrugations

Translucent structural panels with transverse corrugations—that is, with corrugations running the width, rather than



the length of sheet—are reported to eliminate a considerable number of laps, improving the appearance and simplify the construction of many of company's installations. The transverse sheet is currently available in the 2½ in. corrugation in lengths to 12 ft and widths to 46 in. in all standard colors. Resolite Corp.

12—READING STAND for blueprints and specifications

This all-metal 6-ft blueprint reading stand is for use as a free-standing unit or may be wall-hung. It serves to keep blueprints clean and readable. The 24-by-40½ in. easel swings 360 deg, tilts 25 deg. Blueprints are held by six magnetized blocks, leaving the user's hands free. The easel and support can be lifted from the base for carrying to any location, and the entire assembly can be taken down and compactly stored on a hook. Catalog 2112 gives details. Young Radiator Co.

13—FLOOR WAX has high gloss and resists wear

Super Westwax is a self-polishing floor wax announced as combining a clear plastic in an emulsion (Mirite) with prime No. 1 yellow carnauba wax. Tests are reported to show that its hard, bright

Announcing New, Re-Designed

Arktite

HEAVY DUTY

PLUGS & RECEPTACLES

NEW pressure connectors; no soldering unless you prefer to do it.

NEW easier-to-wire interior assembly; comes out in one piece—just remove 2 screws.

NEW easier-to-interchange plug and receptacle interiors; no machining; no special tools.

NEW plug adaptability; takes any size portable cable up to full 30 amp. capacity.

Circuit-Breaking Features Make Arktite Safe at Full Load Without Disconnect Switches

Each contact is insulated in a separate chamber. Arcs formed while making or breaking circuit are snuffed out in arcing chambers by pressure-deionization and lack of oxygen. No chance of flash-over even if break is made at full load. With grounding contacts longer than load contacts, plug and tool are grounded *before* circuit is made and *after* it is broken.

New *Arktites* now available in 30 amp. size — 2-pole, 3-pole and 4-pole styles. Fully interchangeable with old *Arktites* — *same economical price.*

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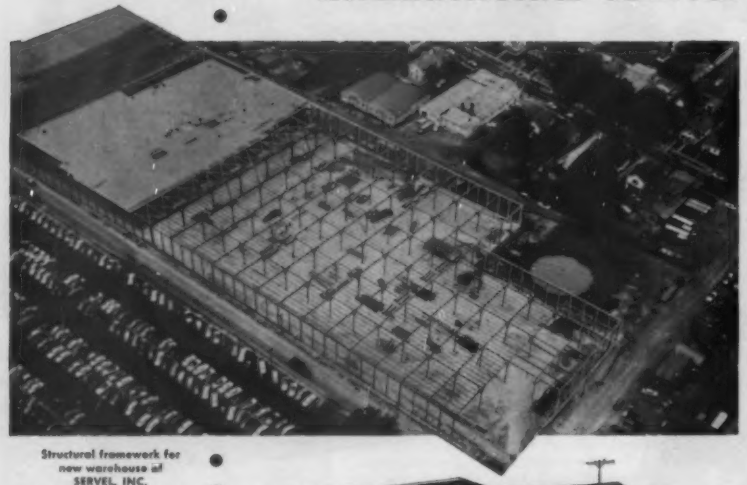

Structural framework for new warehouse of SERVEL, INC.
BYAN CONSTRUCTION CORP., Evansville, Indiana: General Contractor
INTERNATIONAL STEEL CO.: All Structural Steel, Bar Joists, Roof Decking, Doors

SERVEL'S SLOGAN — "the name to watch for great advances in refrigeration and air conditioning" — is well supported by expansion projects such as this newest super-warehouse. Nearly a half-mile around, it provides 260,796 square feet of soundly planned space to speed efficient handling of incoming and outgoing shipments.

Rail and truck facilities are divided by the huge building and installed both indoors and out. These include a double railroad track under roof, also an extensive truck dock served by 23 vertical-lift doors.

Counterbalanced and hand-operated, each 10 feet high by 8 feet wide, all doors for the truck facility were engineered and built by International. International also supplied all structural shapes, bar joists, and roof deck — all delivered to expedite construction of the giant storage structure.

This typifies the advantages offered *you* in complete, and *completely integrated* INTERNATIONAL SERVICE . . . dependable, time-saving, and usually cost-saving too! Mail coupon for confirming data.

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INTERNATIONAL STEEL COMPANY

For more facts circle 585 on Reply Card

NEW PRODUCTS

(Begins on page 128)

finish has extraordinary wearing properties. The product is so formulated that it will not cause yellowing, says manufacturer, even on light-colored floors. A single-coat application of Super Westwax is claimed adequate for most surfaces, since the product contains more than 16 per cent solids. It is suggested for use where long wear and non-slip properties are needed. West Disinfecting Co.

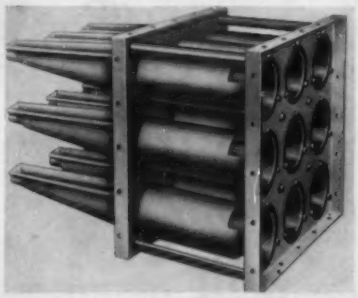
14—SURFACE THERMOMETER for pipes and tubes

This thermometer is fastened to the pipe by a spring clip without use of tools. You merely push the spring over the pipe by hand and the spring snaps into place. The temperature sensistive element is a calibrated bimetal type and is closely coupled thermo-dynamically to the pipe. The accuracy is given as ±2 deg over the entire range, which reaches stability within 5 min. It is not necessary to open any pipe joints to install this thermometer. The bimetal element is protected by a copper cup designed to fit the pipe closely. Two ranges are available: one from —50 to 250 F and the other from 70 to 370 F. The dial is 2-in. in diameter. This thermometer costs less than $7.00. The Pacific Transducer Corp.

15—DUST COLLECTOR for varying concentrations

An outside-in twist that reverses the normal tangential flow of many centrifugal dust collectors is credited with giving the new Amerclone, a dry granular collector, high efficiency over a wide range of air volumes. Power plants burning pulverized coal and rock products and dry chemical plants using large volumes of exhaust air will benefit especially from this, according to manufacturer.

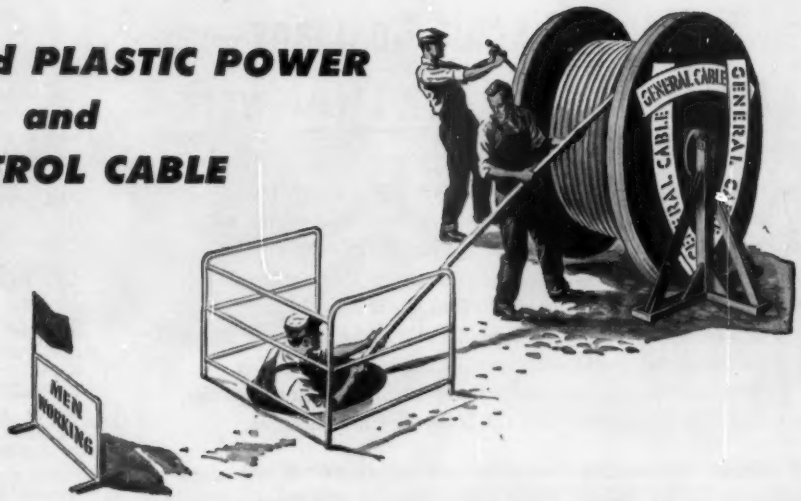
Heart of the development is a conical inlet which imparts a swirling motion to



dust particles while permitting clean air to travel through the tube without changing direction. Each tube has an approach velocity of 1000 fpm and a cleaning capacity of 333 fpm. Nine tubes are combined in a standard modular cell which has a nominal rating of 3000 cfm with a face area only 20 to 20 in. Any number of the modular cells may be combined. Because of this simplified "straight through" air flow design, the units can

THE GREATEST NAME IN ELECTRICAL WIRE AND CABLE

RUBBER and PLASTIC POWER and CONTROL CABLE



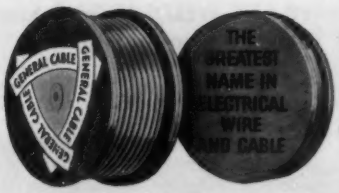
Besides offering the most complete line, General Cable makes top notch engineering service and useful product information easily available.

Rubber and Plastic Power and Control Cables are designed for power transmission, distribution and control...for duct and conduit installation...for direct earth burial...for submarine and aerial use (self supporting types are available).

Rubber or GENCORONE (corona resistant) oil base compound or plastic insulated...with braided, leaded, interlocked or submarine armored finish.

These popular and versatile lines of products are made to meet practically every operating condition. Get the full facts before you buy. Let our engineers help solve your wire and cable problems.

Every type for every use!



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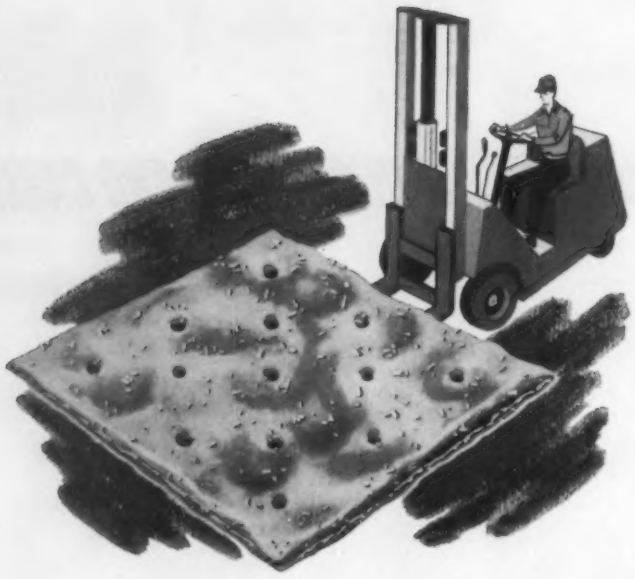

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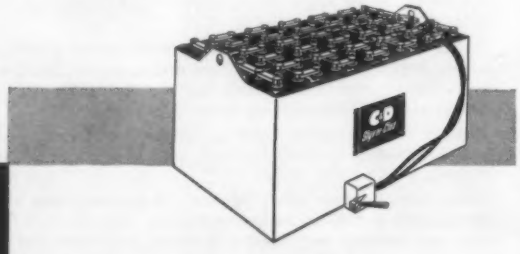
National Biscuit Company, famous for top quality food products since 1898, uses millions of pounds of wheat, sugar, shortening, cheese, chocolate and figs yearly to supply the vast consumer demand for their delicacies. To help handle this huge quantity of materials, Nabisco uses C&D Slyver-Clad* batteries in a number of its plants as a major source of power for their industrial trucks employed in daily operation. For National Biscuit, like hundreds of other important companies, has found it pays to power with C&D Slyver-Clad batteries.

C&D Slyver-Clad batteries are approved as standard equipment by all electric truck manufacturers. For further information, write for catalog.

*T. M. Reg.



C&D BATTERIES, INC.
of Conshohocken, Pa.

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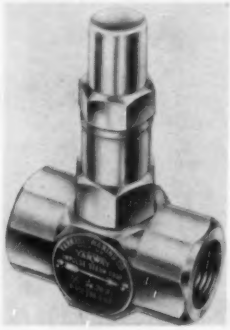
NEW PRODUCTS

(Begins on page 128)

handle widely fluctuating air volumes, and dust concentrations with almost constant efficiency, it is said. Bulletin 291 gives data. American Air Filter Co., Inc.

16—STEAM TRAP handles light condensate loads

A ½ in. impulse steam trap, the 20-A, is especially designed with low capacity to handle light condensate loads. The 20-A will not freeze or air bind on steam tracer



line, manufacturer points out, and it also gives excellent performance on other light load applications such as small platens, autoclaves, and unit heaters. The unit is described as small in size, low in cost. Its body and working parts are made of stainless steel, and it is designed for pressures to 400 psi. Yarnall-Waring Co.

17—FORK TRUCK can work in narrow aisles

Equipped with extendable forks which reach beyond the outrigger wheels, the RSAT-3 Warehouser is designed for increased operating efficiency in aisles as narrow as 6 ft. Hydraulically-operated, the forks slide forward 20 in. to provide 30 in. of effective length beyond outrigger wheels. As load is handled beyond wheels, only enough underclearance is needed to permit fork entry. After load is on the forks, they are retracted to bring the load back against the fork carriage. Forks automatically tilt when load is raised to carrying height to provide stability during transit. The Warehouser has a rated capacity of 2500 lb at 15 in. load center, an 83 in. over-all height and 126 in. maximum fork lift. It is short in length and light in weight for low floor capacities and elevators. The Yale & Towne Mfg. Co.

18—AC WELDERS, high speed, low maintenance

Airco Bumblebee A-C Welders, NEMA rated 300-, 400- and 500-amp models, feature stepless current control, silicone insulation aluminum coil windings, and are equipped with a large current scale which the operator can read from a considerable distance. Fingertip current adjustment and quieter operation are attributed to a new feature in which the coil supports float in a rubber bushing.

4 out of every 10 are for MULTIPLE installations

ERIE CITY KEYSTONE STEAM GENERATOR

Four of seven Erie City "Keystones" are shown at Republic Stamping & Enameling Co., Massillon, Ohio — subsidiary of EKCO PRODUCTS COMPANY, CHICAGO, ILL.

A few other well known users of two or more "KEYSTONES"

Pittsburgh Plate Glass Co.	2- 500 H.P.
Minnesota Mining & Mfg. Co.	2- 250 H.P.
Missouri Pacific Railroad Co.	2- 150 H.P.
Endicott-Johnson Corp.	2- 350 H.P.
Reynolds Metals Corp.	2- 150 H.P. 2- 200 H.P.
Fairbanks-Morse & Co.	3- 500 H.P.
Welch Grape Juice Co.	2- 400 H.P.
General Tire & Rubber Co.	2- 150 H.P. 1- 350 H.P.
American Can Co.	2- 400 H.P.
Gulf Oil Co.	2- 700 H.P.
Union Oil Co.	2- 800 H.P.
Thompson Products Co., Inc.	2- 250 H.P.

Compact, factory assembled and FACTORY FIRE TESTED "Keystone" steam generators fit into any plant's variable steam needs. Multiple "Keystones" permit high efficiency operation. During periods of low loads take one or more units off the line—for high loads the rapid steaming "Keystone" responds quickly to increased requirements.

If your problem is the need for steam at some remote location in your plant, investigate the use of one or more Keystones. Indoors or outdoors "Keystones" are satisfying all types of steam needs. Bulletin SB-51 completely describes the "Keystone" steam generator.

ERIE CITY
114 Years in Steam Generation

You can depend on Erie City for sound engineering

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STEAM GENERATORS • SUPERHEATERS • ECONOMIZERS • AIR PREHEATERS
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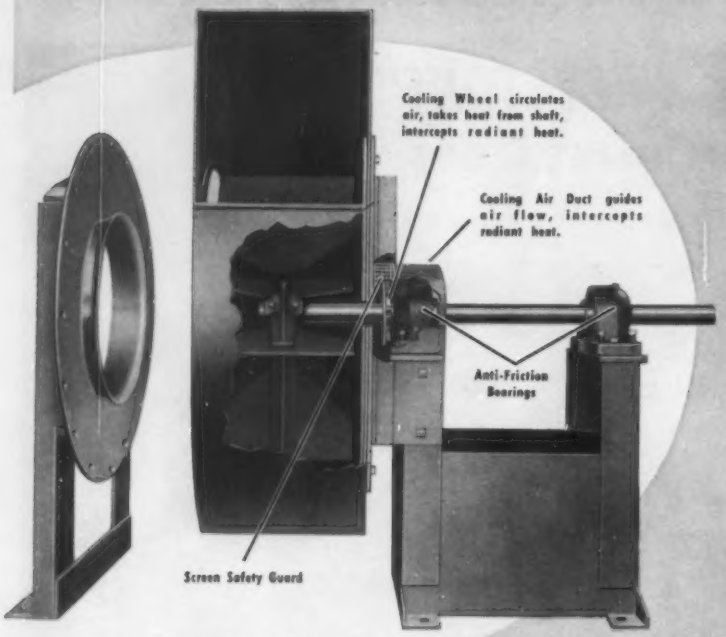
WANT TROUBLE-FREE high temperature air handling?


Cooling Wheel circulates air, takes heat from shaft, intercepts radiant heat.
Cooling Air Duct guides air flow, intercepts radiant heat.
Anti-Friction Bearings
Screen Safety Guard

New Clarage Type XL Fan shown in "opened up" view is typical of the sizes which provide universal discharge.

MONEY-SAVING SOLUTION:

Clarage's new Type XL Fans equipped with AIR Cooled Bearings!

FOR TEMPERATURES UP TO 750° F., here's a simple, dependable, inexpensive feature available on standard Clarage fans. Costlier water cooled bearings NOT required. By all means, on your next "hot" job consult the Clarage sales engineer about this money-saving optional feature.

The new Clarage Type XL Fan — with its advanced design — offers many other important advantages in industrial air and material handling.

Learn about the high efficiency, rugged construction, and in-the-field adaptability of this exceptional fan equipment by requesting Bulletin 702. CLARAGE FAN COMPANY, Kalamazoo, Michigan.

NOTE: For heavier-duty service or temperatures above 750° F., this and other types of Clarage fans can be provided with water cooled bearings.

You can Rely on...

CLARAGE

Headquarters for Air Handling and Conditioning Equipment

SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 Richelieu St., Montreal

For more facts circle 589 on Reply Card

NEW PRODUCTS

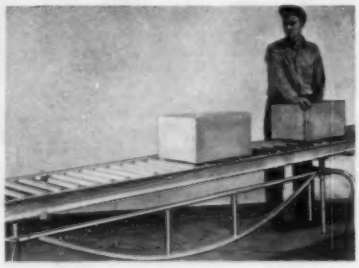
(Begins on page 128)

Accurate current settings may be obtained, it is noted, because these welders utilize a moving primary coil design and logarithmic current scale which has wider calibrations in the lower ranges. Current adjustments are made by raising and lowering the primary coil. The simplicity of this design is said to result in minimum vibration and mechanical wear.

Wide current ranges on the welders (38 to 375 on the 300-amp model) let them be used on almost all industrial applications from light-duty, low current to heavy-duty, high current welding jobs. They are declared particularly suited for heavy section welding where high current is desirable and when arc blow would otherwise cut welding speed and quality. Bulletin ADC719 gives specifications. Air Reduction Sales Co.

19—ROLLER CONVEYORS are portable magnesium units

Constructed entirely of magnesium, these portable roller conveyors are announced as weighing considerably less than comparable equipment of similar size and capacity. Suitable for permanent or for



portable use, manufacturer points out, the conveyor can be easily set-up or dismantled by one man. It is available in two capacities; 500 lb and 900 lb. Roller sizes range from 12 in. to 20 in. The units can be installed as a complete system, or supplied in individual sections, with couplers to match existing systems. Portable magnesium stands in three height ranges from 17 in. to 72 in. above floor level, are also offered. Magline Inc.

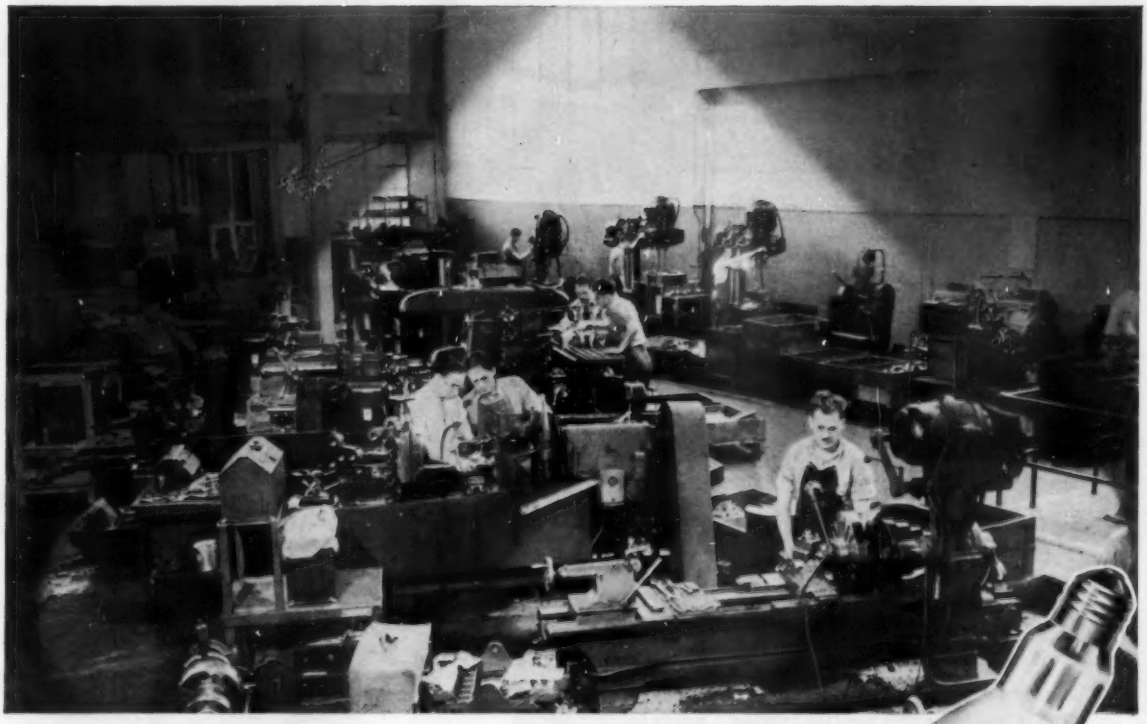
20—TRANSMITTING UNIT for low pressure services

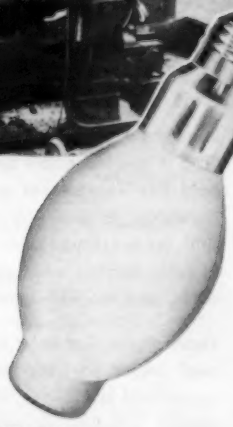
The BalanCel Pneumatic Transmitter, Model ATD, is introduced as a low cost, sensitive unit for water filtration, sewage and low pressure industries service. It is compact (7 in. long and 4 lb in weight), operates on the force-balance principle, and delivers a pneumatic output pressure, changes in which are proportional to changes in loading pressure, or of the difference or sum of more than one loading pressure.

The output may be a direct or inverse function of a single loading pressure or of the difference or sum of more than one loading pressure. Small diameter tubing between transmitter and remote

NOW...

this much "golden white" light from a single 400-watt mercury-vapor lamp





SYLVANIA J-H1 mercury-vapor lamp

HERE'S THE LAMP that opens new vistas in lighting... SYLVANIA's new, color-improved mercury-vapor lamp, type J-H1.

With this new lamp, you get more "golden white" light . . . without the color distortions you expect from a clear mercury lamp . . . 18,000 lumens of "golden white" light . . . in a lamp that lasts over two years in normal industrial use. That's more than twice the output of an incandescent lamp of equivalent wattage.

Relight with Sylvania J-H1 color-improved mercury-vapor lamps from your Sylvania supplier today.

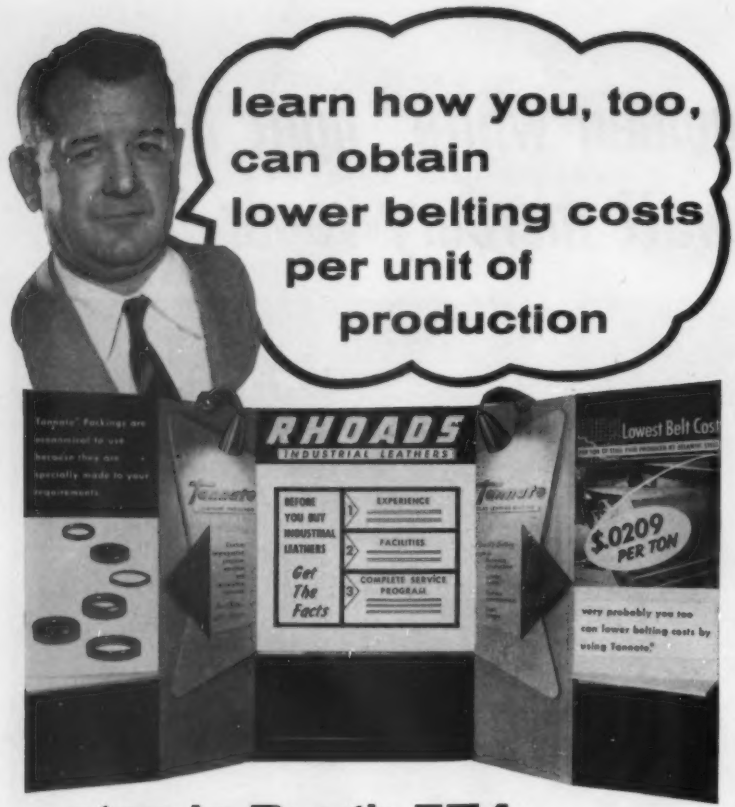
FOR THE FULL STORY
on Sylvania mercury-vapor lamps, write for the free booklet "More Light for Less Money."

Dept. 5L-5501,
SYLVANIA ELECTRIC PRODUCTS INC.
1740 Broadway, New York 19, N. Y.
In Canada: University Tower Building, St. Catherine Street, Montreal, P. Q.

LIGHTING · RADIO · ELECTRONICS
TELEVISION · ATOMIC ENERGY

Keep your eye on SYLVANIA
...fastest growing name in sight

For more facts circle 590 on Reply Card



stop in Booth 574

plant maintenance show

Learn how to lower belt costs with Tannate Leather Belting. Stop in and learn how **Special Tanned** Tannate Leather Belting combines exceptional grip, pliability, elasticity, strength and durability, to give you lower belt cost per unit of production. And, let us tell you how Tannate Leather Belting will resist to a greater degree moisture, mineral oils, and the fumes of most acids, and will withstand high temperatures.

Learn how Tannate Hydraulic and Pneumatic Packings seal better, last longer. If you need packings that will seal better and last longer, then stop in and let us tell you about the special advantages you'll get with special tanned Tannate Leather. They're custom impregnated to meet your requirements. If you can't make the show, write direct to J. E. Rhoads and Sons, 35 N. 6th St., Phila. 6, Pa.

RHOADS
INDUSTRIAL LEATHERS

PHILADELPHIA • NEW YORK • CHICAGO • ATLANTA

For more facts circle 591 on Reply Card

NEW PRODUCTS

(Begins on page 128)

instrument conveys the pneumatic signal which actuates the instrument mechanism. The BalanCel is suggested for measuring rate of flow, loss of head, liquid level, and pressure (up to 35 psi), as well as for the summation or averaging of two or more quantities. According to company, the transmitter is simple to install, has no delicate parts, is unaffected by air supply pressure changes, and has a minimum output pressure of 3 psi. Builders-Providence, Inc.

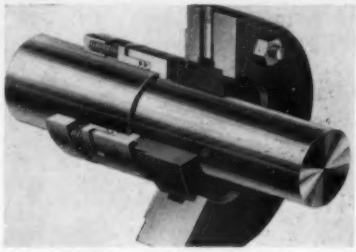
21—COATING lessens heat transfer through glass

Liquid Crystal Heatgate is claimed to help keep winter heat in and summer heat out. According to manufacturer, this liquid dries to a clear, transparent coating that lessens the amount of heat going through the glass or other surfaces. Packaged in pints, quarts and gallons, this coating also comes in a 6 oz size for around $1.00. Randolph-Page Inc.

To receive product data circle item number on the handy Reader Service Cards provided on pages 169-170.

22—MECHANICAL SEAL for high pressure sealing

The Type P.T. Inside Dura Seal-Balanced is a rotary mechanical seal for retaining process fluids under high pressures. According to manufacturer, it is



designed for pressures from 50 to 600 psi, temperatures from –80 to 400 F. This rotary unit can be fabricated from selected metal alloys for handling practically all kinds of fluids except molten alkali metals and some fluorine compounds in the higher temperatures. For mounting the rotary unit a cut down shaft or stub sleeve is required and a packing space of ½ in. clearance or larger. Durametallic Corp.

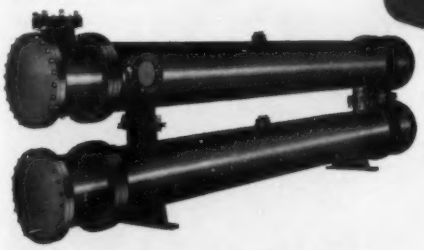
23—COOLANT CONCENTRATE is water soluble type

Degerm, an antiseptic liquid soap, is announced as low in cost and high in bacteria-killing efficiency. The new soap, designed to kill germs as it washes the hands, contains Actamer, a bacteriostat.

FOR LONG SERVICE
WITHOUT SERVICE

B&G
HEAT EXCHANGERS

Tank Suction Heaters • Oil Preheaters • Condensers • Evaporators • Aftercoolers • Gas Coolers Oil Coolers • Centrifugal Pumps Water Heaters



Two single pass, channel head B & G Heat Exchangers for series operation

B & G Heat Exchanger with U-bend tubing

For additional information on B & G Heat Exchangers send for Catalog DM-1150.

B & G shell and tube Heat Exchangers give you *more value per dollar because they are built that way!*

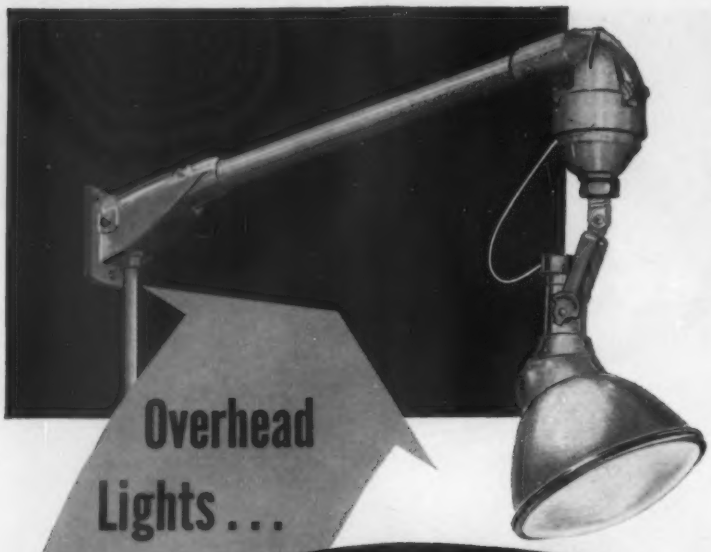
Basically efficient in design, these units are offered with straight and U-bend tubing. Ample material thicknesses in every detail and high tensile strength bolting are assurance of lasting strength and long operating life. Full tube bundles and close tolerances between shell wall and baffles prevent slippage of fluid and assure maximum heat transfer. Units can be furnished with tubing of copper, steel, several of the stainless steels and other non-ferrous alloys.

B & G Heat Exchangers are built to ASME Code U-69 requirements and can be certified by Hartford Steam Boiler and Inspection Service.

Whatever your heat exchange problems may be, remember that the B & G engineering staff is always available for consultation.

BELL & GOSSETT
COMPANY
Dept. DS-53, Morton Grove, Illinois
Canadian Licensee: S. A. Armstrong, Ltd., 1400 O'Connor Drive, Toronto, Canada

For more facts circle 592 on Reply Card



Overhead Lights . . .

Servisafe
BRACKET UNITS
FOR WALL AND WOOD POLE MOUNTINGS

. . . serviced from the ground

NOW . . . luminaires mounted on walls and wood poles can be serviced in minimum time with complete safety. "Servisafe" Units feature a disconnecting and lowering mechanism that permits workmen to lower the lights for servicing and to reposition them quickly and easily. All operations are accomplished from the ground. All climbing and electrical hazards are eliminated.

Supplied in ready-to-install packages*, "Servisafe" Bracket Units have an unlimited range of application. They permit all-weather accessibility to luminaires . . . mounting heights up to 60 feet above ground level . . . fast, efficient, low cost maintenance.

Designed for new installations and the rapid conversion of existing facilities, "Servisafe" Bracket Units can be used with all standard pendant and flood type lighting fixtures.

* *Luminaires are not included in Bracket Unit packages.*

FOR ADDITIONAL INFORMATION, WRITE FOR BULLETIN WPH-54.

6011-TE

THE THOMPSON ELECTRIC CO.
1165 POWER AVENUE • CLEVELAND 14, OHIO

For more facts circle 593 on Reply Card

NEW PRODUCTS

(Begins on page 128)

It is claimed that regular daily use of this soap destroys up to 97 per cent of all bacteria on the skin, and the Actamer forms a protective film that keeps bacteria at a low level.

According to company, Degerm costs little more than many toilet soaps; it has a pleasing fragrance and contains olive oil and a soothing emollient which makes the hands feel clean and soft. Degerm is a concentrated liquid which should be diluted before use with two or three parts of water. Samples and prices are available. Huntington Laboratories, Inc.

24—SAFETY SHOE insulates feet against heat, cold

Here is a new type of safety shoe developed for hot mills, refrigeration departments, yard use or wherever feet are exposed to extremes of heat or cold. The entire upper of the Thermaliner Shoe is padded with a thin layer of foamed vinyl that contains millions of tiny "sealed air" bubbles. According to company, the vinyl padding does not absorb moisture, perspiration, oil or odors. Regular steel toe protection is included in this shoe. Lehigh Safety Shoe Co.

25—HAND TRUCK totes the heavier loads up steps

A new stair climbing hand truck, the Stair Cart, is said to safely double the load a man can roll up steps and treble the load he can move down stairs or

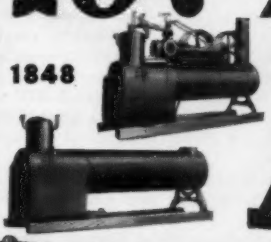
ramps. According to manufacturer, it has a special ratchet mechanism which enables it to roll step-by-step as the operator pulls a cable drive. Two-wheel safety brakes incorporated are designed to allow perfect control to prevent accidents when descending ramps or stairs with heavy loads. The truck has large pneumatic tires. Six models are available for handling various loads, including a barrel cart and complete welding cart. Valley Craft Products, Inc.

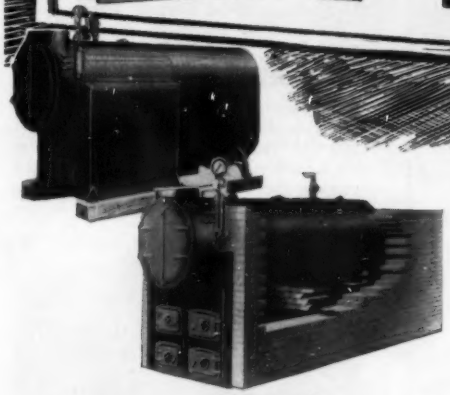
26—EXPANSIBLE RESINS for silicone foam structures

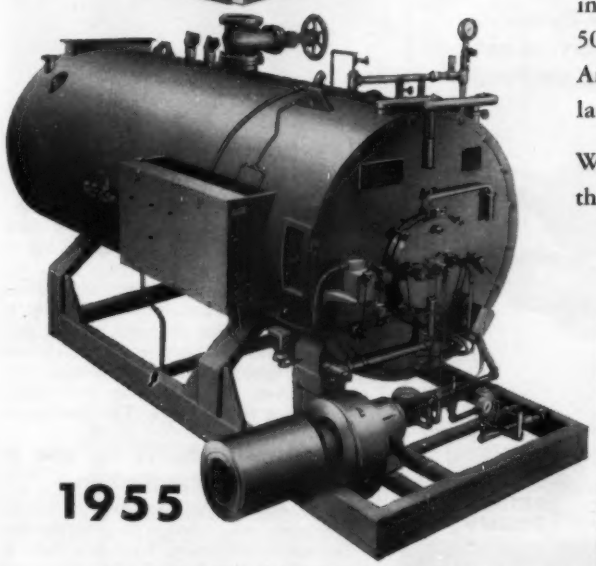
Now available in the form of "ready-mix" powders are a series of expansible resins for foam structures. These powders contain pre-measured proportions of resin, filler, blowing agent and catalyst. They are formulated to melt, foam and

107 YEARS of RELIABILITY ARE BEHIND EVERY AMESTEAM GENERATOR

1848







1955

AMESTEAM GENERATOR

20 sizes, 10 to 600 H.P., 15 to 200# W.P., oil, gas, or oil-gas combinations with quick fuel switchover feature.

In your selection of a boiler, it's important to remember — experience *does* count. And what better assurance of top boiler quality do you have than the Ames record: 107 years of building fine boilers — boilers which have given economical, satisfactory service throughout the industry! Many Ames units purchased 40 to 50 years ago are still faithfully on the job. Amesteam Generators always incorporate the latest advances in package boiler design.

Write today for details on these boilers with the proven record of reliability.

AMES IRON WORKS, INC.

Box M-15, Oswego, N.Y.

Show me how I can benefit from Ames experience and nation-wide organization in getting a top boiler value.

NAME .....

ADDRESS .....

COMPANY .....

For more facts circle 594 on Reply Card

THE *Pitch* IS IMPORTANT IN A

WARREN-QUIMBY SCREW PUMP

The capacity of this pump is determined by the *"pitch" of the screws* and the full load speed of the motor. Expert engineering knowledge of just the right pitch, number of threads, experience data, and precision workmanship are all mighty important in this highly specialized type of pump. It is available in two general types:

Gear-in-head, with internal gears and bearings, for handling lubricating liquids free of corrosive elements and solids.

Double External Bearing and Gear, with separately lubricated gears and bearings, for handling all other liquids.

Standard pumps include jacketed, unjacketed, horizontal, vertical pedestal, vertical bulkhead, long body and hopper types in all machinable metals. Capacities, up to 3000 g.p.m. and pressures up to 700 p.s.i. on low viscosity liquids, and practically unlimited for high viscosity liquids which will flow into the pump inlet.

For specialized services involving hard-to-handle materials, insist upon Warren-Quimby, the original Screw Pump . . . now owned, greatly improved, manufactured, serviced and guaranteed by Warren . . . one of the pioneers of the Pump Industry.

Centrifugal • Reciprocating • Rotary

WARREN QUIMBY PUMPS

WARREN PUMPS

WARREN STEAM PUMP COMPANY, INC.

Warren, Massachusetts

For more facts circle 595 on Reply Card

NEW PRODUCTS

(Begins on page 128)

cure by themselves when heated, without further mixing or processing. Described as non-toxic, easily handled and unaffected by humidity or atmospheric pressure, these mixes can be cast into sheets or blocks, made up as sandwich structures, or foamed in place. Only negligible pressure is exerted during expansion, it is pointed out, so that molds may be light weight and do not require preheating. Density can be controlled by varying the expansion temperatures; in some applications, foam can be post-cured in service.

Three separate mixes—R-7001, R-7002 and R-7003,—produce a graduated range of mechanical strengths at elevated temperatures. Company says all remain stable at as high as 700 F and exhibit good physical and electrical properties, low moisture absorption. They cost up to $5 a pound. Dow Corning Corp.

27—COOLING TOWER is a packaged, steel unit

This packaged steel Double-Flow Aquatower is designed for loads in the 60 to 100 ton range. Intended primarily for air conditioning and refrigeration applications, the unit is suitable for industrial water cooling. Aquatowers are factory

assembled in three sub-assemblies which can be safely shipped, easily hoisted and quickly assembled in the field.

The new line is equipped with multi-blade, cast aluminum, adjustable pitch fans with V-belt drive; casing and basins are fabricated from heavy gage steel. Interior surfaces are protected with corrosion resistant Marmastic, and exterior is painted with zinc chromate primer and a heavy coat of aluminum paint. Other design features include self-cleaning cold water basin, nail-less filling, and simplified piping requirements. The Marley Co.

28—ANODE PLATE for use in cathodic protection

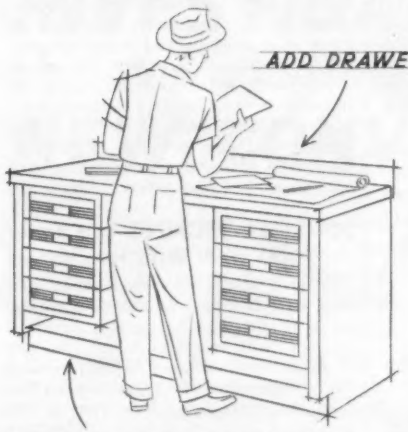
Alcoa Anode Plate consists of a special aluminum alloy designed primarily for cathodic protection of steel ship hulls in sea water. Anodes cut from this plate serve as sacrificial electrodes to relieve galvanic attack on the hull. Potential applications of this product include the protection of heat exchangers, storage tanks, and various types of condensers. The plate is made in one size—1 by 36 by 96 in.—which can be cut into any size.

HOW TO USE STANDARD HALLOWELL CABINET BENCHES AND ACCESSORIES IN PLANT MODERNIZATION

MODEL 608 - STEEL TOP, STEEL BACK PANEL, BOTTOM SHELF, AND CABINET TYPE BENCH LEGS

ADD TOP SHELF

ADD DRAWER TIERS



USE THEM AS INDIVIDUAL BENCHES

ASSEMBLE THEM IN CONTINUOUS LINE

4 TOP MATERIALS, 3 LENGTHS, 4 WIDTHS 4 HEIGHTS - ALL STANDARD

ADD SLIDING DOORS AND SHELVES

Standard Units · Standard Accessories · Sturdy Steel Construction · Stocked by Leading Shop Equipment Dealers · Send for "Benchery" - a Humorous Booklet on What You Can Do with Hallowell Benches · Hallowell Shop Equipment Division, Standard Pressed Steel Co., Jenkintown 26, Pa.

HALLOWELL SHOP EQUIPMENT DIVISION

SPS

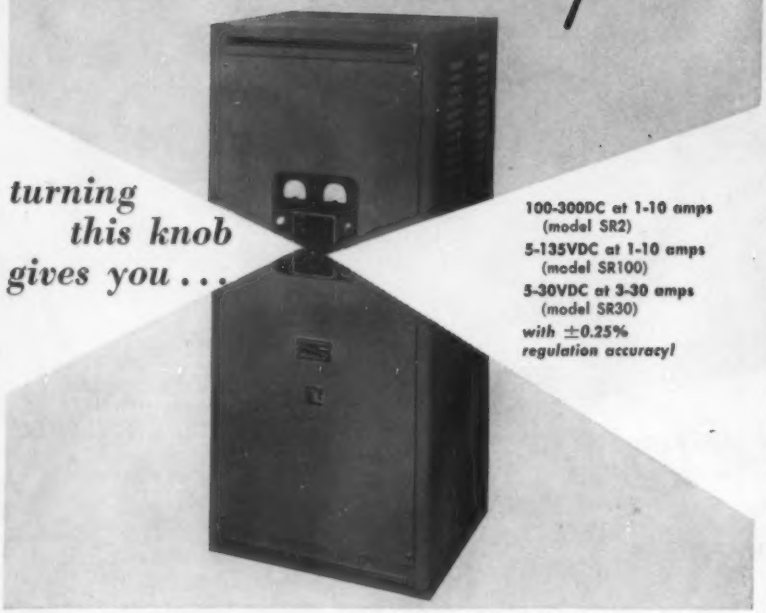
JENKINTOWN PENNSYLVANIA

BENCHES (CABINET, WORK, UNIT) • STOOLS AND CHAIRS • SHOP DESKS • TOOL STANDS AND CABINETS • DRAWERS, DRAWER TIERS • STEEL CARTS • SHELVING

For more facts circle 596 on Reply Card

Here's the versatile, regulated DC source you've been looking for - - -

NOBATRON*-Ranger



turning this knob gives you . . .

100-300DC at 1-10 amps (model SR2)
5-135VDC at 1-10 amps (model SR100)
5-30VDC at 3-30 amps (model SR30)
with ±0.25% regulation accuracy!

The Sorensen Nobatron-Ranger is essentially an adaptation of the proved Nobatron circuit**, with the added feature of continuously adjustable output voltage over a wide range. This makes the RANGER an exceptionally good investment for the many laboratories and test installations where a multi-purpose DC source can be used to advantage.

ELECTRICAL CHARACTERISTICS

Input voltage range	95-130VAC, 1Ø, 50-60~ for models SR30 and SR100 190-260VAC, 1Ø, 50-60~ for model SR2
Output voltage and load range	5-30VDC at 3-30 amps in model SR30 5-135VDC at 1-10 amps in model SR100 100-300VDC at 1-10 amps in model SR2
Regulation accuracy	±0.25% at any output voltage setting with an input between 105 and 125VAC. The accuracy will be slightly less at the extreme value of the input.
Ripple	1% RMS max. of output setting

All RANGERS are 22" wide by 17¼" deep by 47¼" high. They are self contained in handsome cabinets, equipped with casters for easy mobility. Meters are furnished as standard equipment, and there is adequate protection against overload, overvoltage, and tube filament failure.

Write for further information, and for your free copy of the new Sorensen general catalog, to Sorensen & Co., Inc., 375 Fairfield Ave., Stamford, Conn. In Europe, please correspond directly with Sorensen A.G., Gartenstrasse 26, Zurich 2, Switzerland.

SORENSEN
375 FAIRFIELD AVENUE, STAMFORD, CONNECTICUT

*Reg. U.S. Pat. Off.
**Model SR2 uses a circuit device patented by Wm. J. Brown.

For more facts circle 597 on Reply Card

NEW PRODUCTS

(Begins on page 128)

The anodes are fastened with studs, nuts and washers, preferably of 18-8 stainless steel. Although preferable to locate anodes on flat areas, company says the plate can be contoured to fit sharp curves. Aluminum Co. of America.

29—LOW COST TORCH for cutting and gouging

Smaller in size and especially designed for light work, the Model G-2 uses electrodes up to ¼-in. diam. It costs less than $50. Like company's heavy-duty torches, this new model operates from a d-c welding machine and a compressed

air line. It removes defects in castings or forgings, cleans the roots of welds and removes welds, says manufacturer; also it grooves, bevels, or cuts mild steel, stainless steel, hard alloy brass, bronze, Monel and cast iron. It is reported to be faster than chipping and more economical to operate than oxygen equipment.

The torch has a rotating nozzle designed to permit changing electrode angle as needed but maintain the air jet in alignment. Depth of cut is easily regulated, it is noted, and welding slag does not hamper cutting action. Arcair Co.

30—STEEL DECKING can cover 100 sq ft with two sheets

Twenty-ft lengths of 30-in. wide steel roof deck are now available. Manufacturer of the decking says it covers a "square" with only two sheets; also that it saves times in roof laying, requires fewer welds and affords greater rigidity over the entire roof. Properties of this company's standard decking are retained in the new product, including 1⅝-in. deep ribs on 6-in. centers with ⅝-in. bearing surfaces and top openings of only 1 in. The decking comes in 18-, 20- and 22-gage thicknesses. All welding at erection is done from the top side. Catalog 204 gives data. Airtherm Mfg. Co.

31—HOIST CONTROL for use in heavy industry

The Bulletin 14166 a-c hoist controller for use with wound rotor motors is announced as combining characteristics of the eddy-current load brake and regulating magnetic amplifier to obtain speed-torque curves previously unavailable on a-c hoists. Excitation of the eddy-current load brake is provided by the magnetic amplifier whose output, in turn, is dependent on the balance between field strengths of the amplifier's reference

IF your present conveyors aren't doing a PERFECT job—

INVESTIGATE this amazing NEW CONVEYOR!

IF your product is too hot, sharp or oily for belt or flight conveying, or too abrasive or sticky for screw or apron conveying — if you're getting excessive spillage, if you have cleaning problems, or any other conveying difficulties — *you owe it to yourself to investigate the Carrier Natural-Frequency Conveyor.*

These revolutionary conveyors are an entirely new *type* of vibrating equipment which substitutes Natural-Frequency spring action for brute force. Where "brute-force" conveyors may use up to 90% of their power to operate their moving parts and only about 10% to convey their loads, *the Natural-Frequency Conveyor uses substantially no more power to operate, empty, than is required to run the motor alone.*

CARRIER ADVANTAGES

HIGH CONVEYING SPEED
(Up to 100 feet per minute)

GREATER CAPACITY
(Up to 200 tons per hour)

LESS POWER REQUIRED
(About one-third as much as "competitive" equipment)

LESS MAINTENANCE & DOWN-TIME
(Less power + good design = trouble-free performance)

NO DAMPENING UNDER LOAD
(Designed with extra power for specified load, with positive stroke)

SELF-CLEANING
(Continuous, smooth trough — no pockets)

COMBINES PROCESSING WITH CONVEYING
(Can screen, dry, cool, dewater, blend, etc.)

WIDTHS FROM 6" TO 48"—LENGTHS FROM 5' TO 250'
(With pans 16 ga to ½" plate, of any metal, open or enclosed)

BALANCED, VIBRATION-FREE UNITS AVAILABLE
(For use on ceilings or light floor construction)

CARRIER NATURAL-FREQUENCY CONVEYORS

Carrier Conveyor Corporation
2138 Frankfort Avenue, Louisville 6, Kentucky
Gentlemen:
Without obligation, please send me Carrier Natural-Frequency Conveyor Bulletin No. 111.

Firm_____

Street_____

City_____ State_____

Att. Mr._____ Dept._____

For more facts circle 598 on Reply Card

FEEDRAIL standardized units make it easy to power crane or hoist runs—including curves, slide switches, transfers, turntables and spurs. Feedrail's free-running trolleys roll as one with cranes and hoists.

ELECTRIC FEEDRAIL

Reliability will keep your cranes and hoists rolling!

SOLD BY OVER 1,000 ELECTRICAL DISTRIBUTORS COAST TO COAST

RELIABILITY is one of the big reasons Feedrail is so widely favored for powering electric cranes and hoists. User after user will tell you—*"We've never had a minute's trouble with our Feedrail system."* That's because Reliability is inherent in Feedrail's expertly-engineered, trouble-eliminating design and rugged high-precision construction.

FEEDRAIL RELIABILITY is your insurance against crane and hoist stoppages . . . it keeps them rolling! What's more, Feedrail assures maximum safety to personnel . . . easy adaptability to changing requirements . . . a very minimum of maintenance. And, its prefabricated units are so simple to install!

GET THE FULL DETAILS

Write today for descriptive bulletin. Direct your request to Feedrail Corp., Department P-1

53-3

Never Becomes Obsolete

FEEDRAIL CORPORATION

Subsidiary of Russell & Stoll Company, Inc.

125 BARCLAY STREET • NEW YORK 7, N. Y.

SPECIALLY QUALIFIED REPRESENTATIVES IN PRINCIPAL CITIES

For more facts circle 599 on Reply Card

NEW PRODUCTS

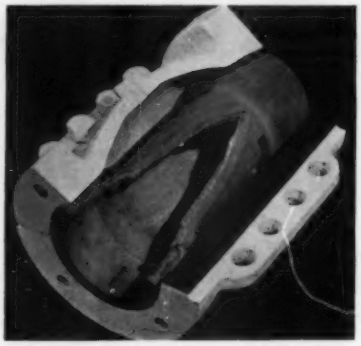
(Begins on page 128)

field as established by the position of the hoist master switch and the amplifier's signal field as established by the actual speed of the hoisting motor.

The regulating action thus provided is claimed to afford a set of specific lowering speeds virtually unaffected by changes in hook load. The eddy-current crane brake also aids the hoist's magnetic holding brake in decelerating the load each time the hoist is stopped, to prolong the lining and wheel life of the holding brake. Automatic eddy-current brake failure protection is also provided. Lowering speeds are adjustable by slide wire rheostats on the control panel. The controller also provides a choice of two first point lowering curves by a change of only one electrical connection. Publication EC-165 gives data on this unit. Cutler-Hammer, Inc.

32—CONTROL VALVE handles solids in suspension

The Red Jacket Valve, operated either pneumatically or manually for control or on-off service, is offered for handling solids in suspension acid slurries or other



bulky materials. Valve body is cast iron and the sleeve is pure gum rubber, butyl or Neoprene. It does not require a large mechanical operator to close it, it is pointed out, and the impulse from the instrument or solenoid valve can be put directly to valve body. It comes in sizes from 1 to 24 in. Red Jacket Co., Inc.

33—SAFETY SWITCH designed for compactness, economy

This 100 amp circuit breaker safety switch, in a space-saving enclosure which occupies half of space required by comparably rated fused switches, is announced for service on 120/240 v a-c, in two or three wire installations. It incorporates two single-pole hydraulic-magnetic circuit breakers with handle extensions attached to form one double-pole unit, allowing both circuit breakers to be switched on or off together. The unit employs general purpose type circuit breakers in ratings of 70 or 100 amp.

The safety switch is said to be economical in terms of first costs, maintenance, and production time. And while it

Springs into Action . . .

THANKS TO BATTERY POWER!

Battery power is the most dependable industrial truck power available today. It is amazingly efficient because it springs into action instantly, transmitting energy to the wheels with a minimum of moving parts, a minimum of friction. That's why battery-powered trucks have in-service records that are unequalled. There's *no* power like battery power. There's *no* battery power like the Gould "Thirty" with new Diamond "Z" Grids.

Specify
THE GOULD "THIRTY"
with New Diamond "Z" Grids—
America's Finest
Industrial Truck Battery

Always Use Gould-National Automobile and Truck Batteries

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GOULD-NATIONAL BATTERIES, INC.
TRENTON 7, N. J.

For Railroad Air Conditioning and Lighting | For Mine Shuttle Cars and Locomotives | For Electric Industrial Trucks | For Diesel Locomotive Starting | For Standby and Emergency Power

For more facts circle 600 on Reply Card

How to select the right liquid meters

. . . to save time and ingredients, with closer quality control, and more accurate cost accounting. That's the subject of this helpful free bulletin. It covers meters for measuring hot and cold water, oils, syrups, brines, soap solutions, and many other chemical solutions that can be handled by composition bronze meters. Illustrates sizes from ½" to 6", with rates of flow to 1000 gpm. Registers range from simple counters to the newest Auto-Stop automatic batching meters. A gold mine of information for any processing engineer. Bulletin 566UPE.

Acetate, Amyl
Acetate, Butyl
Acetate, Ethyl
Acetate, Lead
Acetone
Alcohol, Amyl
Alcohol, Ethyl
Alcohol, Methyl
Ammonium Nitrate Solution
Ammonium Sulfate Solution
Asphalt, Liquid
Banana Oil
Barium Chloride
Benzol
Boiled Oil
Borax Solution
Brine
Bronzing Liquid
Bunker "C"
Butanol
Calcium Chloride Brine
Carbon Bisulphide
Carbon Tetrachloride
Castor Oil
Cellulose Solvent
China Wood Oil
Chloropicrin
Chocolate
Cleaner, Asphalt Tile
Cocoa Butter
Coconut Oil
Code Rubber Oil
Coffee
Condensate
Corn Molasses
Corn Syrup
Cotton Seed Oil
Crude Oil
DDT
Dextrine Solution
Diacetone
Dibutyl Phthalate
Diethyl Carbitol
Diethylene Glycol
Diethyl Hexyl Phthalate
Dimethyl Phthalate
Dioctyl Phthalate
Dope (Nitrocellulose)
Esther Gum Oil, Drying
Ethyl Cellosolve
Ethylene Glycol
Fish Oil
Formaldehyde
Freon
Fuel Oil, Hot
Glucose
Glue, Water Solution
Glycerine
Grease
Ink, Oil Vehicle
Ink, Water Vehicle
Isobutylene
Isopropanol (Isopropyl Alcohol)
Kerosene
Lacquer
Lime Water
Linseed Oil
Liquid Soap
Liquid Sugar
Lubricating Oil, Hot
Lubricating Oil
Mesityl Oxide
Methylated Spirits
Methyl Bromide
Methyl Cellosolve
Methyl Formate
Methyline Chloride
Mineral Oil
Mineral Spirits
Molasses
Monochlorbenzoll
Naphtha
Nitrocellulose Lacquer
Oleic Acid
Oleum Spirits
Orthodichloro Benzine
Paint
Paraffin Oil
Paste
Perfume
Petrolatum
Pine Oil
Plasticizer
Polymer, Molten
Potassium Carbonate
Propylene Glycol
Pyrethrum Mixtures
Rum
Shellac, Alcohol Sol.
Silicone Oil
Silicon Tetrachloride
Size Solution
Soap Solution
Sodium Benzoate
Sodium Carbonate
Sodium Chloride
Sodium Silicate
Soy Bean Oil
Starch Solution
Stearic Acid
Stoddard Solvent
Styrene Monomer
Sugar Syrups
Tallow
Tannic Acid
Tire Compound
Trichlorethylene
Tricresyl Phosphate
Tungwood Oil
Turpentine
Varnish
Varsol
Vinyl Lacquer
Water
Wax Emulsions
Whiskey
Wine
Xylol

148 INDUSTRIAL LIQUIDS ARE LISTED . . .
How many of these can you handle better with Neptune Meters?

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neptune liquid METERS

For more facts circle 601 on Reply Card

NEW PRODUCTS

(Begins on page 128)

compares in prices with fused switches and other circuit breaker switches, it is designed to eliminate expense of replacing fuses or elements. Circuit breakers in the unit have inverse time delay to prevent nuisance tripping. Minimum and instantaneous trip points are unaffected by heat or cold, manufacturer says, so that safe use of full capacity of the wiring is assured. Bulletin 1411 gives more details. Heinemann Electric Co.

34—RUBBERIZED PAINT for exterior masonry surfaces

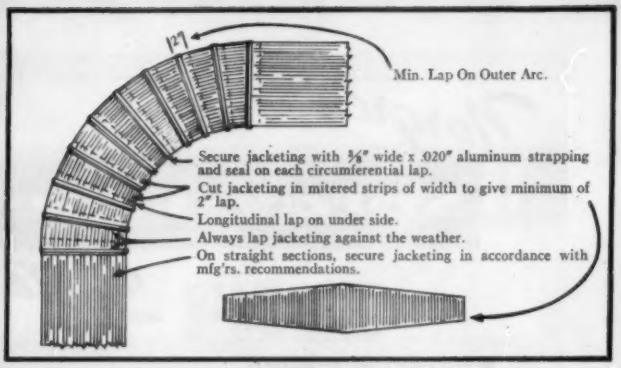
Cementhide Rubberized Masonry Paint is a polyvinyl acetate formulation for exterior surfaces. Manufacturer says it is a water emulsion paint, requires no petroleum or coal tar solvents, and is as easily applied as interior latex emulsion finishes. An outstanding property announced is ability to waterproof the exterior while letting water, in the form

of vapor, pass through the film from interior to exterior to prevent the formation of blisters.

This paint may be applied by brush, roller or spray without primer or sealer, and will be available in eight colors and white. All colors have good alkaline resistance and wont "burn out" on masonry surfaces, it is said, and the paint may also be used on interior masonry surfaces provided hydrostatic pressure is not involved. On well sealed surfaces, one coat may be sufficient, but two coats are recommended. Drying time is fast enough that a surface may be recoated in several hours, according to company, and coverage varies from 150 to 350 sq ft per gallon, depending on surface porosity. The paint is said to provide a flat sheen, to resist moisture and sunlight and protect against dirt and stains. It is expected to sell for less than $6 a gallon. Pittsburgh Plate Glass Co.

35—STRESS ANALYZER uses X-ray diffraction method

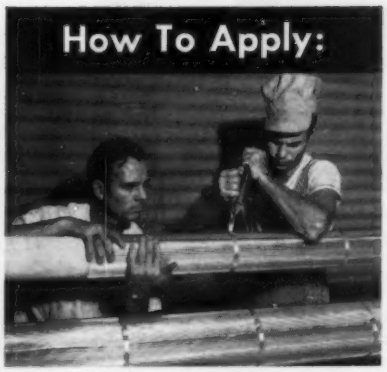
With the Androscope, practical nondestructive residual stress measuring can be transferred from the laboratory to the plant itself, says the manufacturer of this portable stress analyzer. It uses the X-ray diffraction method to measure the magnitude and sense of residual stresses in metals, plastics and other materials. The Androscope readily distinguishes between tensile and compressive stresses,


12"
Min. Lap On Outer Arc.
Secure jacketing with ¾" wide x .020" aluminum strapping and seal on each circumferential lap.
Cut jacketing in mitered strips of width to give minimum of 2" lap.
Longitudinal lap on under side.
Always lap jacketing against the weather.
On straight sections, secure jacketing in accordance with mfg'rs. recommendations.

New method of applying aluminum jacketing over pipe bends with a radius of 5 diameters or more is shown above.

Cutaway view shows how jacketing goes on right over the insulation. Tests show Childers is the lowest cost of any permanent metal jacketing that is available today.

Only pliers and pocket knife needed to apply easy-to-handle Childers Aluminum Jacketing



Best method of applying jacketing is with aluminum strapping and seals. Other method is to use sheet metal screws.

Aluminum strapping can be pulled tight enough with just pliers. Lugs are then bent over and fastening is complete.

Eastern States Petroleum's two-man crew covers insulated lines, even L's and bends—using light-weight, weatherproof aluminum jacket.

Childers Jacketing for insulated lines, made of .006" 3S alloy aluminum, was used to cover thousands of feet of line in Eastern States Petroleum's Houston plant.

As it does in over 1000 other plants in all 48 states and many foreign countries, Childers Jacketing helped save Eastern States many expensive hours of application and maintenance time.

In fact, tests show this: Two men, working with Childers Jacketing for the first time, can cover more feet of insulated line in a day than with practically any other kind of covering. This means real savings in application costs.

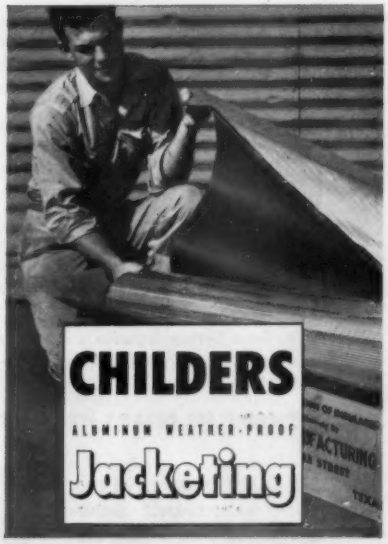
The cost is low, too. You can actually put aluminum jacketing on your lines for less than the cost of the cheapest weatherproofing when one paint job is considered.

Immediate shipment from our large factory stocks can eliminate costly delays in construction or plant improvement schedules.

Try this low cost protection in your plant. Write today for engineering data and information about how you can order a 400 sq. ft. roll to test on one of your insulated lines. No obligation. Address: Childers Manufacturing Company, Department PLE4, 3620 West 11th Street, Houston, Texas.

Engineering representatives in most cities to work with you on jacketing problems.

For more facts circle 602 on Reply Card



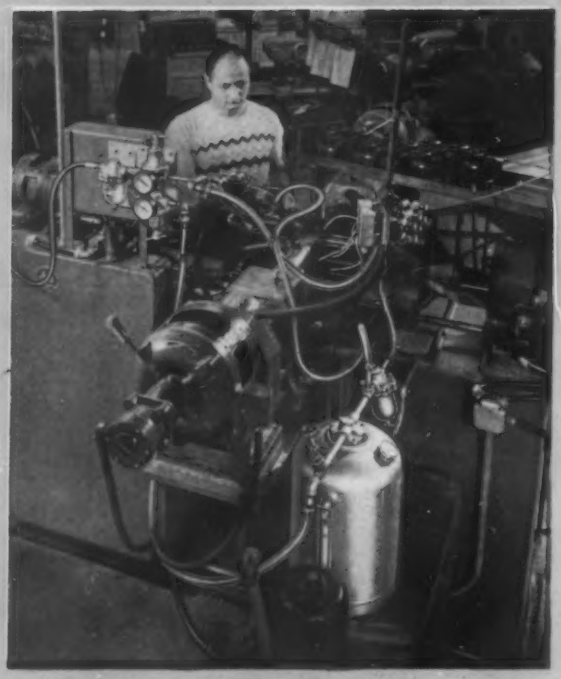
Childers Jacketing arrives on the job in convenient rolls 4 feet wide and 100 feet long—easy for one man to handle. Jacketing comes with or without a moisture barrier attached to the back of the .006" aluminum. Rolls are well protected for field storage if kept dry. Boxes light enough for one man to carry. (Adv.)

Norgren

Spray-Lube System

- increased tap life
- increased tapping speed
- eliminated problem of chips plugging coolant lines
- eliminated messy condition of splashing coolant

for **A-P CONTROLS CORP.**



Machine taps 12 holes of various sizes simultaneously. Norgren Spray-Lube System includes 4½ gal. tank, 12 mixing valves and spray nozzles. Air and fluid line pressures are 42 psi and 44 psi respectively.

FOR COMPLETE DETAILS WRITE FOR NORGREN BLUEPRINT NO. SL-4

SEE OUR EXHIBIT ... AT THE PLANT MAINTENANCE SHOW Chicago, Jan. 24-27 • Booth 314

C. A. Norgren CO. 3443 So. Elati, Englewood, Colo.

VALVES • FILTERS • REGULATORS • LUBRICATORS • HOSE ASSEMBLIES

For more facts circle 603 on Reply Card

NEW PRODUCTS

(Begins on page 128)

it is pointed out, and is easily operated. Stresses are recorded visually on film in 10 to 20 min, and a rapid comparator provides quantitive measurements. Magnitude of stress in pounds-per-square-inch is determined from a formula using the figure from the rapid comparator. Holger Andreasen, Inc.

36—MILLIAMMETER with combination of ranges

This new volt-ohm-milliammeter, the Model 980, has a combination of functional ranges covering a variety of electronic test measurement applications. It has a d-c sensitivity of 20,000 ohms/volt and an a-c sensitivity of 1000 ohms/volt. Accuracy is given as 2 per cent d-c and 3 per cent a-c. Range and functional switching is simplified by use of a single dial for all ranges and functions. Overall size of the instrument is 6¼-by-7½-by-3¼ in. Its weight is 2 lb and scale length is 4.63 in. Ranges, specifications and prices are given in a bulletin. Weston Electrical Instrument Corp.

37—CONVEYOR SECTIONS are mounted on turntable

Announced for selective switching to conveyor lines at sharp angles, these turn table mounted conveyor sections permit

assembly, sanding, painting, inspection and crating of heavy or cumbersome objects, such as motors machines and cabinets on the conveyor. The turn table units are made in 500- and 1000-lb capacities. Roller conveyor sections can be furnished any width, length and height. Samuel Olson Mfg. Co., Inc.

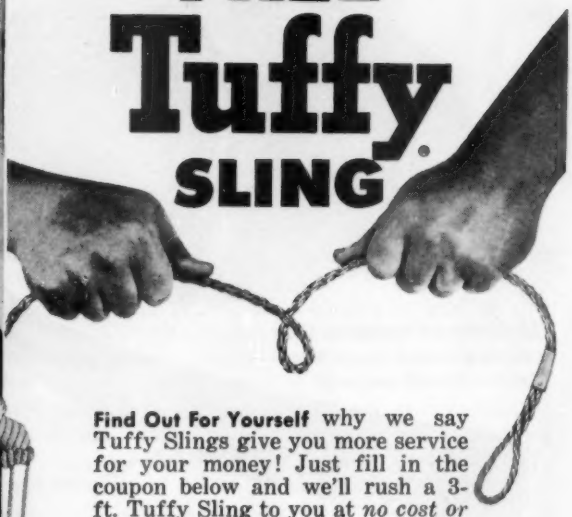
38—SIGNAL LIGHT for industrial warning use

This electric signal light, the Beacon Ray 27-S, may be used to indicate hazardous work areas, or as a visual communications signal in noisy shops, or over long distances. Modeled after company's revolving light used on fire and police vehicles, this light uses the principle of a colored light beam revolving horizontally in a 360-deg arc, producing 100 flashes per minute—the rays reported visible at 30 miles. It operates on 110-v power and will sell at about 35 per cent less than a previous $100 model.

Manufacturer says the light is applicable for use in steel mills, foundries, machine shops, as a crossing warning light for in-plant railroad installations,

TEST IT TO DESTRUCTION IF YOU CAN!

FREE Tuffy SLING



Find Out For Yourself why we say Tuffy Slings give you more service for your money! Just fill in the coupon below and we'll rush a 3-ft. Tuffy Sling to you at *no cost or obligation.*

Then Prove Tuffy's Toughness with any test you want to make! Loop it, knot it, kink it, jerk it—we won't be worried, even if you test your free Tuffy Sling on weights up to *twice* the rated working load!

You'll Find The Exclusive, patented braided-wire fabric construction takes strains and jolts that soon snap ordinary rope slings! It's the unique machine braided, 9-part construction that helps your Tuffy Sling resist kinking—and if you *can* kink it, you straighten it out in minutes *without material damage!*

Get Your Free Tuffy Sling and discover why more and more people are switching to Tuffy every year!

Tuffy HOIST LINE

The Hoist Line That Matches Tuffy Slings in strength and wearability—that's *Tuffy* Hoist Line! Absorbs load shocks smoothly, because it's designed *only* for hoisting . . . passes safety checks weeks after ordinary ropes would have been thrown away!

Ordering Is Easy! No complicated specifications—just state length, diameter and the name, "Tuffy Hoist Line." Reeve your crane with Tuffy and see the difference!

Your Tuffy Distributor Will Help You Keep Your Inventory Down!

He's Happy To Stock Ahead of your needs . . . wants to work closely with you to assure the best possible service. Just give him a rough idea of your future requirements and backed up by his nearby Union Wire Mill depot, he will keep a full stock to draw on against your needs. Get together with him—*soon.*

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Specialists in High Carbon Wire, Wire Rope and Braided Wire Fabric

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Union Wire Rope Corporation
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At no cost or obligation to me, please rush the material I have checked:

- ☐ FREE 3-Ft. Tuffy Sling!
- ☐ FREE Sling Handbook and Rigger's Manual, Featuring 12 Tuffy Factory-Fitted Types!
- ☐ Name and Address of Tuffy Distributor Nearest Me!

FIRM NAME _____

BY _____ TITLE _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

For more facts circle 604 on Reply Card

On hydraulic applications LATTICE BRAID* Flax Packing holds together even when worn, outlasts ordinary packings 3 to 1

*Registered Trademark. Only Garlock makes LATTICE BRAID rod and shaft packings.

Check these typical service reports:

- *Locomotive Manufacturer*—Hydraulic pumps handling water, 1,500 to 2,000 p.s.i. Garlock 745 LATTICE BRAID Flax packing gives from 4 to 12 months service where previous braided packings lasted a maximum of a few weeks.
- *Steel Company*—Hydraulic accumulator handling cold water, 5,000 p.s.i. Best service from previous packings 6 weeks to 2 months. Garlock 745 LATTICE BRAID Flax packing lasts 6 months, rings form better in stuffing box, do not tear in service.
- *Rubber Company*—Hydraulic presses handling water, 160° F., 2,100 p.s.i., ¾" packing, plungers worn and rough. Maximum service from previous packings 1 month. Garlock 745 LATTICE BRAID Flax packing lasts 4 months.
- *Steel Company*—Hydraulic accumulator handling water, 800 p.s.i., 48" ram, 1" packing. Previous packings lasted 6 to 8 months. Garlock 740 LATTICE BRAID Flax packing gives 2½ years service.

Get all the facts about LATTICE BRAID *Packings. Contact your Garlock representative or write for new folder AD-131.*

THE GARLOCK PACKING COMPANY, PALMYRA, NEW YORK

Sales Offices and Warehouses: Baltimore • Birmingham • Boston • Buffalo • Chicago • Cincinnati • Cleveland Denver • Detroit • Houston • Los Angeles • New Orleans • New York City • Palmyra (N.Y.) • Philadelphia Pittsburgh • Portland (Oregon) • Salt Lake City • San Francisco • St. Louis • Seattle • Spokane • Tulsa.

In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.

GARLOCK LATTICE BRAID PACKING

For more facts circle 605 on Reply Card

NEW PRODUCTS

(Begins on page 128)

and for signalling on long production lines. It is available with green, blue, amber and clear lenses—and in a red lens which is restricted to warning usage in locations not in conflict with official warning or emergency lights. Federal Sign and Signal Corp.

39—BEARING LINERS now available individually

Manufacturer of Nylined Bearings for use primarily where no lubrication is possible or where increased wear resistance is required, now offers liners of the bearing only. Previously they offered only the complete bearing comprising an outer shell and a Nylon liner with a compensation gap and connecting oil distribution grooves. The liners permit cost savings by eliminating outer shell in cases where the user can retain the liner in his own housing. It is said that this method often provides a bearing installation which costs less than ordinary metal bearings.

Two types of liners are available. Liners having a spiral compensation gap, to correct for expansion and contraction of Nylon and having interlocking portions to prevent loss of oil from ends of the bearing, are offered for applications where lubrication is required. A simplified liner, having a straight or spiral compensation gap, and without interlock or oil compensation grooves, is offered at a further cost savings. Housing bore recommendations are furnished for both types. Thomson Industries, Inc.

40—SAFETY GUARDS you can build for yourself

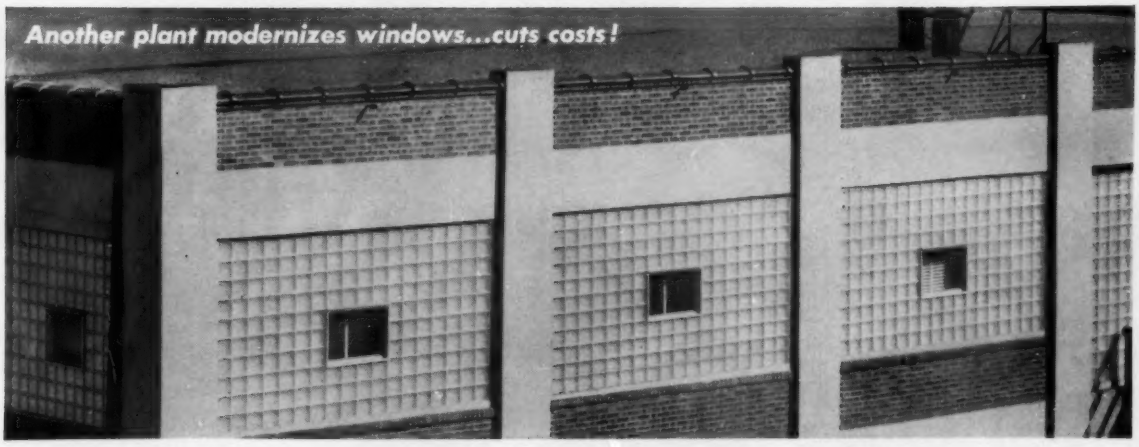
Safety guards for gears, belts, flywheels and other moving parts of machines, as well as for individual punch press dies, are reported to be made quickly and at low cost by using these standardized guard parts. Since the only tools required are a screw driver, hammer, hand snips and hack saw, the guards can be assembled and installed at the point of use. When properly made, these guards receive approval of state and insurance inspectors, says company.

Individual punch press die guards when made of 5- or 6-in. wide standardized slotted strips of 1/16-in. are declared effective. For building guards around moving parts, the company supplies steel sheets with staggered round holes, steel perforated angles and bands, steel perforated corner gussets, and malleable sockets for use as feet for floor mounting and fitting over matching floor posts for positioning. Harrington & King Perforating Co.

41—INSULATION TESTERS; triple or single voltage

Two new models of Megger Insulation Testers are now available in rectifier-operated units. One has a range up to 100,000 megohms at 5000 v d-c with 1000-v and 2500-v intermediate ranges; the other, a range up to 200,000 megohms

Another plant modernizes windows...cuts costs!



"We saved the cost of a new heating plant with PC Glass Blocks,"

says **E. W. Meyers, Jr.,**
President, Trion, Inc.,
Pittsburgh, Pa.

Trion, Inc. is a world-famous manufacturer of electronic air cleaning equipment, so naturally they didn't want dirt seeping into their plant.

The old steel sash let in dirt. And, it leaked so much air that the heating plant was inadequate. Trion licked both of these problems and got a better looking building to boot when they eliminated the steel sash and installed PC Glass Blocks.

Mr. Meyers says, "We not only saved the cost of a new heating plant, but we reduced our heating bill as well. The PC Glass Blocks have eliminated dirt infiltration, and our building looks better than ever before."

In summary: PC Glass Blocks will improve the appearance of your building, give much better daylighting, and reduce dirt. They also cut heating and cooling bills because a PC Glass Block panel has the insulating efficiency of an 8-inch masonry wall.

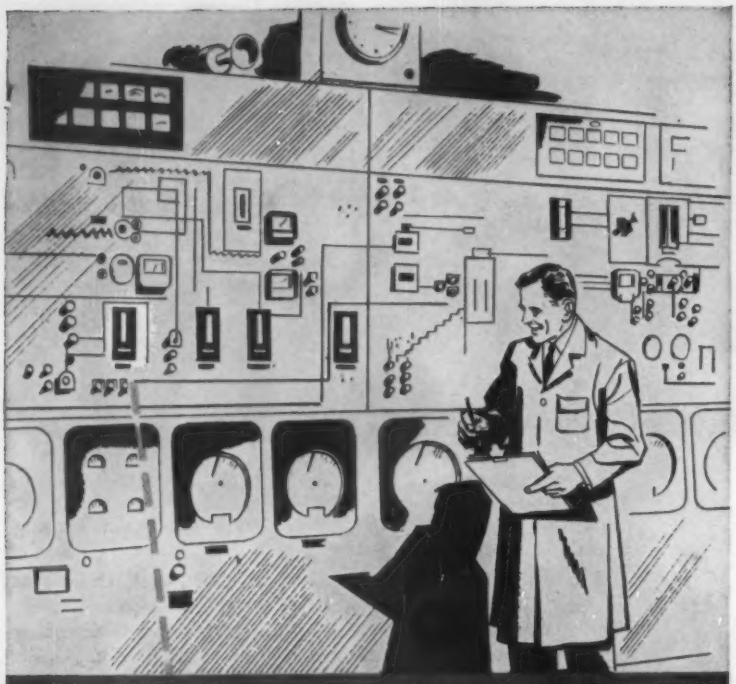
NEW FREE BOOKLET "How To Modernize Old Windows" tells the complete story. Write to Pittsburgh Corning Corporation, Dept. PG-15, One Gateway Center, Pittsburgh 22, Pennsylvania.

PC Glass Blocks

® PITTSBURGH PC CORNING

ALSO SKYTROL® AND FOAMGLAS®

For more facts circle 606 on Reply Card



How much would a failure here cost you?

—FOR DEPENDABILITY . . . INSIST ON TEN THOUSAND HOUR RCA "SPECIAL REDS"!

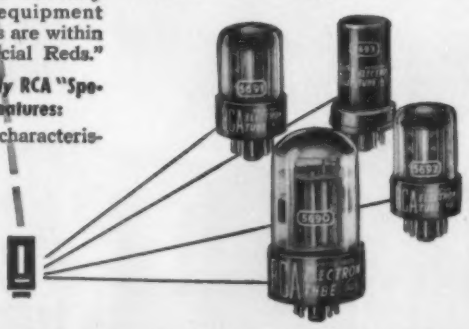
Large, complex production facilities may now be easily controlled directly from a centralized panel . . . and the electron tubes behind these controls have become vital to successful modern production facilities.

Industrial plant owners have invested and are currently investing millions of dollars in automatic and electronically controlled devices. Their confidence in electronics warrants the finest industrial receiving tubes—RCA "Special Reds." Be sure—specify RCA Special Reds in new designs and as replacements for prototypes currently used in your industrial equipment where operating conditions are within the ratings of RCA "Special Reds."

RCA "Special Reds"—and only RCA "Special Reds"—offer *all* these features:

- extreme uniformity of characteristics from tube to tube
- exceptional stability throughout life
- extra long life (10,000 hours, minimum)
- rigid construction for resistance to shock and vibration
- finest quality materials and workmanship

See your local RCA Tube Distributor today . . . Ask him for a free copy of "RCA Special Reds" kit (3F214D). The name, address, and phone number of your local RCA Tube Distributor may be found in the Electronics Section of "Thomas Register."



RCA ® **RADIO CORPORATION of AMERICA**
ELECTRON TUBES HARRISON, N.J.

For more facts circle 607 on Reply Card

NEW PRODUCTS

(Begins on page 128)

at 10,000 v with no intermediate voltage ranges.

In the case of bushings, the insulation resistance of new units should be in the order of 50,000 megohms, it is pointed out, and any deterioration occurring in service, which can be detected at 2500 v d-c, will be observed with a Megger Instrument of that range and voltage. Generators, transformers and cables can have relatively high 1-min insulation resistance values which may increase with time during a time-resistance test. In such cases, manufacturer says the instrument range should be high enough to permit observation of this increase or resistance with time. More data is in Bulletin 21-20-25. James G. Biddle Co.

42—PULLER HOIST is versatile portable machine

Besides combining many desirable features of winches and portable chain-hoisting devices, the Tirfor Griphoist is light in weight, can be used in any position, and incorporates unlimited cable travel, so that any length of cable may be used. The mechanical principle utilized is an application of a crank and

cam-and-lever combination. The cable passes through the unit—it does not reel inside. Two pairs of steel jaws grip the cable. Each pair alternately grips and pulls then releases and slides back.

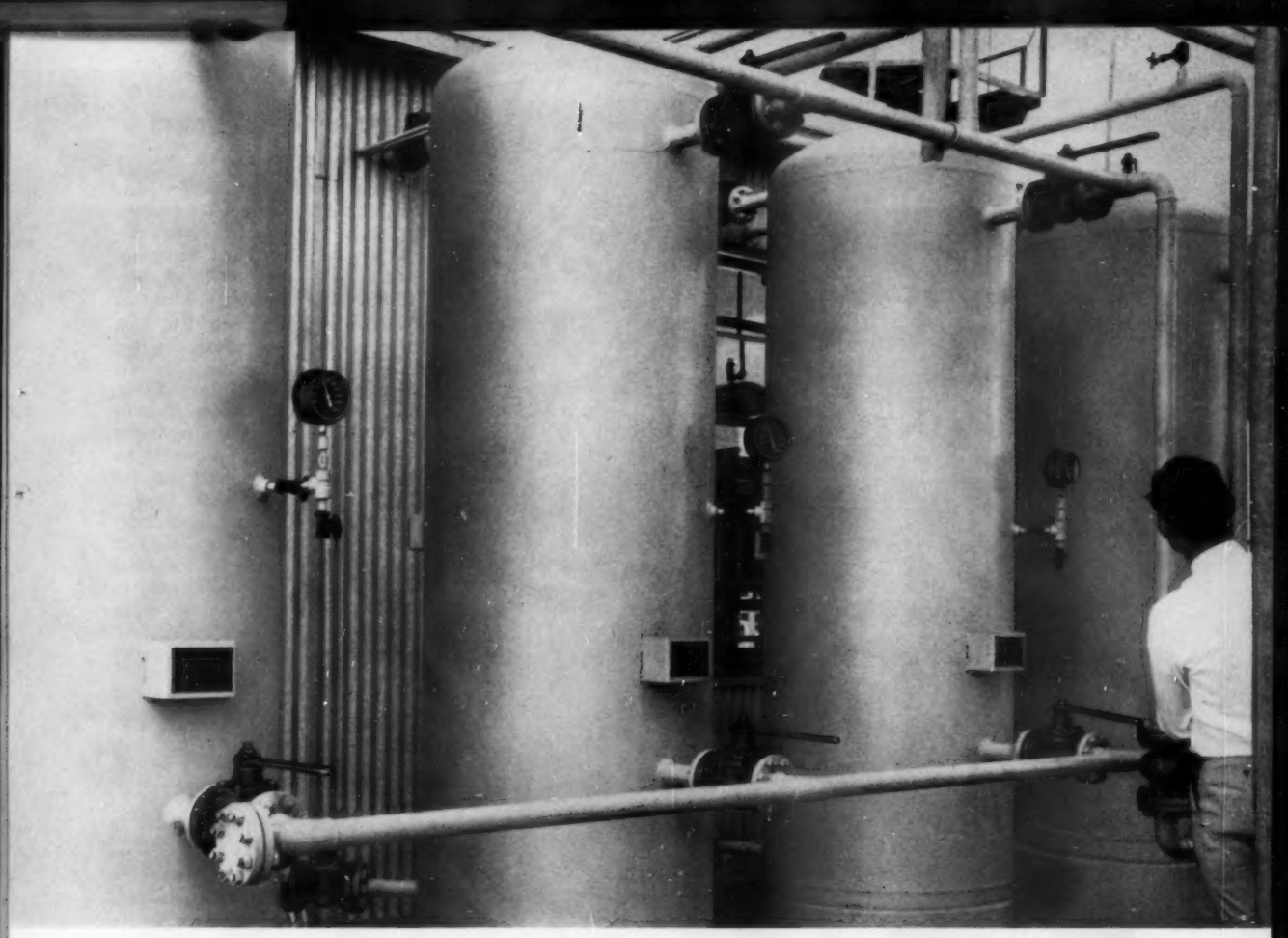
To operate, the clutch is opened and cable introduced through, being free to take up slack to the load until clutch is closed. A telescopic handle is used to lift or pull, and a safety feature is provided to lock clutch when load is applied.

A push-pull motion of the handle pulls or releases about 2¾ in. of cable, says company, and the smooth motion permits precision control. The load is held when the handle motion is stopped. Uses of this machine include construction work, pulling heavy cable through conduit, spotting freight cars, and emergency jobs where power hoists can not be used. Griphoist, Inc.

43—THREAD LUBRICANT for titanium, stainless steel

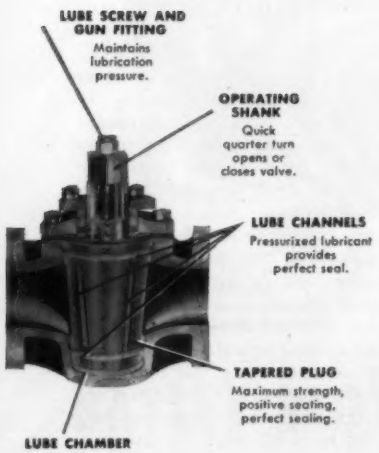
This thread lubricant is announced for use on titanium, stainless steel and aluminum. It is available in two grades. Blue Goop, for temperatures to 400 F, is said to eliminate galling so threads can be reused over and over again. Silver Goop for temperatures to 2100 F is described as an effective antiseize compound for use on threaded parts of stainless steel and high temperature alloys. Both grades are available in tubes. Crawford Fitting Co.

For more facts circle 608 on Reply Card →



Find out all the ways

Rockwell-Nordstrom Valves Can Cut Costs for YOU


LUBE SCREW AND GUN FITTING
Maintains lubrication pressure.
OPERATING SHANK
Quick quarter turn opens or closes valve.
LUBE CHANNELS
Pressurized lubricant provides perfect seal.
TAPERED PLUG
Maximum strength, positive seating, perfect sealing.
LUBE CHAMBER
Jacks plug for easy operation, if necessary. No stuck valves.

In your plant there are probably scores of places—on degreasing equipment, or on air conditioning, fuel, hydraulic, and compressed air lines, for example—where Rockwell-Nordstrom valves can cut costs by doing their job better, longer, for less money per year.

The reason is simple. Forty years ago Rockwell-Nordstrom lubricated valves were created for tough oil field jobs ordinary valves couldn't handle. If they're a good investment for these rugged services, they're a doubly good investment for valve jobs in your plant.

Here's why:

—Sure shut-off. A film of pressurized lubricant around the plug provides a tighter seal than is possible with ordinary metal-to-metal contact.

—Easy, quick operation. Rockwell-Nordstrom valves *glide* open and shut on lubricant, which also hydraulically jacks the plug free from the seat. And because only one-quarter turn is needed, positive control response is assured. They're ideally suited for plant automation.

—Longer Life. Lubricant prevents grinding wear of metal-to-metal friction. Rockwell-Nordstrom valves last longer—cut maintenance, replacement and down time cost. And initial cost is no more than ordinary valves.

Send For Free Facts

A booklet showing Nordstrom principles and applications in industrial and process plants is yours for the asking. Send the coupon for Bulletin V-215.

ROCKWELL-Nordstrom VALVES

LUBRICANT SEALED FOR POSITIVE SHUT-OFF

Rockwell Manufacturing Company, Pittsburgh 8, Pennsylvania Dept. 5-A

☐ Please send me Bulletin V-215 ☐ Please send name of nearest Rockwell-Nordstrom industrial distributors

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Company_____

Street_____ City_____ Zone____ State_____

Announcing

HILLS-McCANNA

Saunders Patent

DIAPHRAGM VALVES with bodies of POLYVINYL CHLORIDE

With the addition of valves with unplasticized, rigid polyvinyl chloride (P.V.C.) bodies, Hills-McCanna further expands the most extensive line of corrosion-resistant valves. Now, the corrosion resistance and rugged durability of P.V.C. is available in a valve of proved and accepted design.

Hills-McCanna P.V.C. valves are available in handwheel or lever operated types or with air cylinder, diaphragm motor or electric motor operators for remote or automatic control. Sizes range from ½" through 2". All regular diaphragm materials are available (rubber, Neoprene, Kel-F, Teflon, etc.). Screwed ends are standard. Slip fits available on special order.

Write for further information. HILLS-McCANNA CO., 2450 W. Nelson St., Chicago 18, Ill.

DESIGN DETAILS

- **Working parts isolated from flow.**
- **No packing.**
- **Leaktight under pressure or vacuum.**
- **Simple pinch clamp closure principle.**
- **Minimum maintenance even in the severest service.**

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saunders patent diaphragm valves

Also manufacturers of
Chemical Proportioning Pumps • Force-Feed Lubricators
Magnesium Alloy Sand Castings

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Plant Engineering Conferences

(Continued from page 96)

other plants to save unnecessary handling. A deadline was set for mailing these papers in order to allow sufficient time for study and comment. Reminder notices were sent out several times regarding this deadline so that the "firm timing" would be met.

The Plant Engineering Conference, like other Western Electric engineering meetings, was established to take advantage of the experience of individual plants and to offer a means of passing that information along to an assembled group. It also permits the close association for several days a year, of engineers from various locations doing similar work. The direct exchange of experience far surpasses letter writing and materially aids in day-to-day job performance through a prior knowledge of typical installation. All papers discussed at the conference are incorporated into a master index, which now after five years amounts to almost a Handbook for Western Electric plant engineers.

Planned Electrical Maintenance

(Continued from page 105)

This portable test unit is taken directly to the circuit breaker or overload relay and plugged into the nearest outlet. Hooked up with the device to be tested, our model supplies any current from zero to 500 amp, in stepless increments—and supplies it only to the device being checked, without our having to run the risk of overloading the motor, a transformer or any other part of the system which is being examined.

In the case of a new line or of a circuit breaker replacement, it is important to insure that the breaker is properly set so as to provide protection to the system—low enough setting for safety, but not so low as to kick out unnecessarily.

Then periodic checks can be made with the new testing device so as to be certain that the breaker setting remains constant. These periodic checks show up any elements or tripping devices which have changed from their setting because of oxidation or dust.

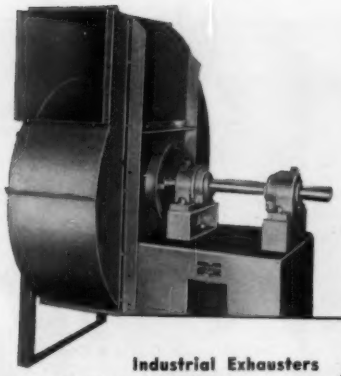
In conjunction with Remington Rand Inc., and their management control specialists, the manufacturer of the tester has devised a simplified method of productive maintenance records for electrical systems.

These control records show the frequency of tests made, the results of such tests, the details of completed repairs, and, in the over-all picture, they form the basis for planning our electrical maintenance.

Bayley

Engineered

AIR HANDLING EQUIPMENT



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Equipped with forward or backward curved wheels—for Ventilating Conditioning, Mechanical Draft.

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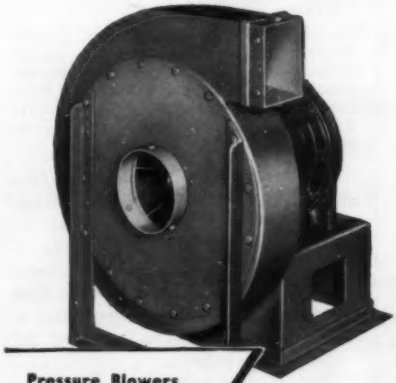
Belt or Direct-Driven, designed for applications requiring moderate air volume.

Heaters
Blast Coils—Aerofin & Chinook; Heating and Cooling; Steam, Water, Direct Expansion.



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Proper selection cuts your engineering time and expense . . . yet enables you to meet the most exacting standards. Each is ready to install, so you eliminate expensive cutting, threading and assembling in the field.

Our engineers, who have solved many tough hanger and piping vibration problems, are always available to both design and make recommendations for your hanger requirements.

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NEW BOOKS

for the plant engineer

How to Control Plant Costs

INDUSTRIAL ACCOUNTANT'S HANDBOOK. Edited by Wyman P. Fiske and John A. Beckett. Size 6 by 9½ in.; 1072 pp, including index; illustrated; cloth bound. Published by Prentice-Hall, Inc., 70 Fifth Avenue, New York, N. Y. Price $13.50 plus shipping charges.

WITH COSTS playing an important part in any industrial project, this how-to-do-it handbook on industrial accounting is a helpful guide to keep your costs in check.

Each chapter is written by a specialist in his field, and the 25 chapters cover such subjects as: controlling overhead costs, forecasting and planning, inventory values and profit measurement, labor accounting and reporting procedures, inventory control procedures and many more.

With the object of showing you how to save time at every step of the job, the handbook tells how to bypass nearly all of the detail work in the control of materials costs through variance analysis by a system of automatic checks at critical points. It outlines an easy, effective method of labor cost control and suggests three work-saving ways to charge off burden costs. These and many other helpful suggestions are presented in this book to help industry keep a close check on its pursestrings.

Plastics Manual

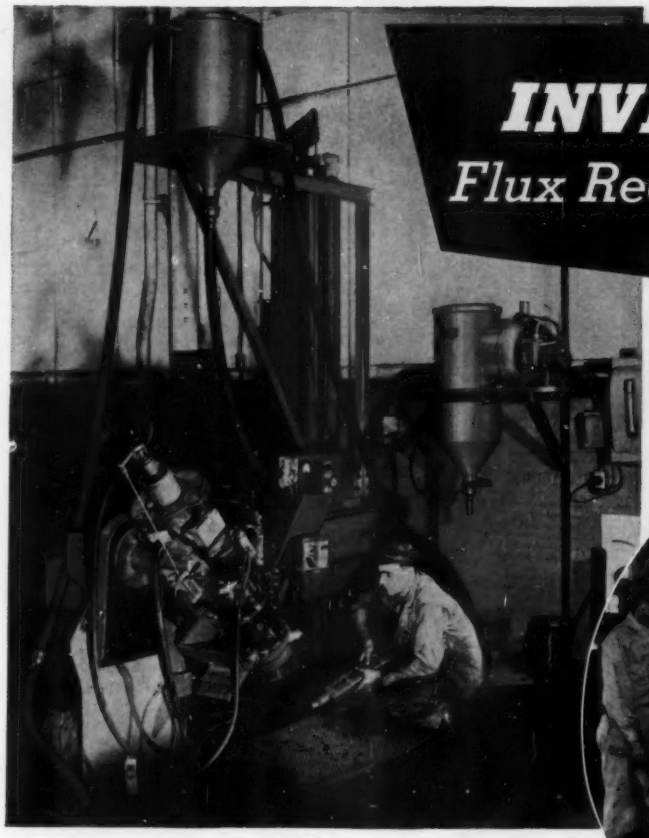
PLASTICS ENGINEERING HANDBOOK. Size 9 by 6 in.; 813 pp including index; illustrated; cloth bound; second edition, 1954. Published by Reinhold Publishing Corporation, 430 Park Avenue, New York 22, N. Y. Price $15.00.

MATERIAL IN THIS edition has been almost doubled over that of the original edition which is known as the SPI Handbook. Entire sections of new information have been included on developments in the plastics field. The book has a wealth of material on design, processes, finishing and assembly, and testing.

An outstanding feature in this book is a chart on adhesives for joining together plastics or plastics and dissimilar materials. This is cross-referenced with a list of manufacturers and their addresses.

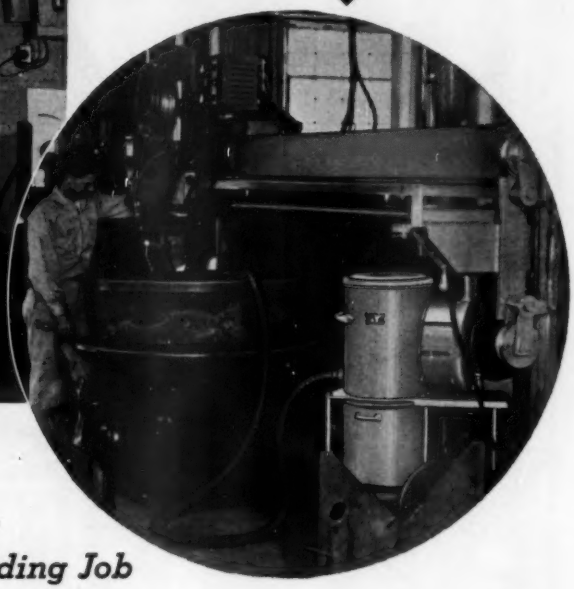
The book gives extensive coverage to the subject of molding and considerable attention to forming, drawing, and postforming. The relatively new development of using plastics in

INVINCIBLE
Flux Recovery Systems



Fully automatic flux recovery in continuous flow by Invincible Model 482.

Salvaging flux the modern way with the portable Invincible Model 460.



there's a type "Tailor Made" for your Submerged Arc Welding Job

Invincible Flux Recovery Equipment is designed to save you money. Here is how Invincibles quickly repay their cost and give you years of trouble-free service:

Save VALUABLE FLUX—Invincibles recover all unfused flux from the work, remove fine dust and fused particles, return slag-free, dust-free, fusible flux to the hopper of the welder.

Eliminate COSTLY MAN-HOURS—Invincibles do the whole job automatically, more rapidly and efficiently than manual methods . . .

Reduce EXPENSIVE REJECTS—By removing all fine dust (flux flour), Invincibles reduce welding rejects and step up production.

Invincible users report big savings and complete satisfaction. These same results can be yours—there's an Invincible Flux Recovery Unit for any job, regardless of its size or type.

Send for folder of Invincible Flux Recovery Equipment at work. It describes and illustrates our complete line.

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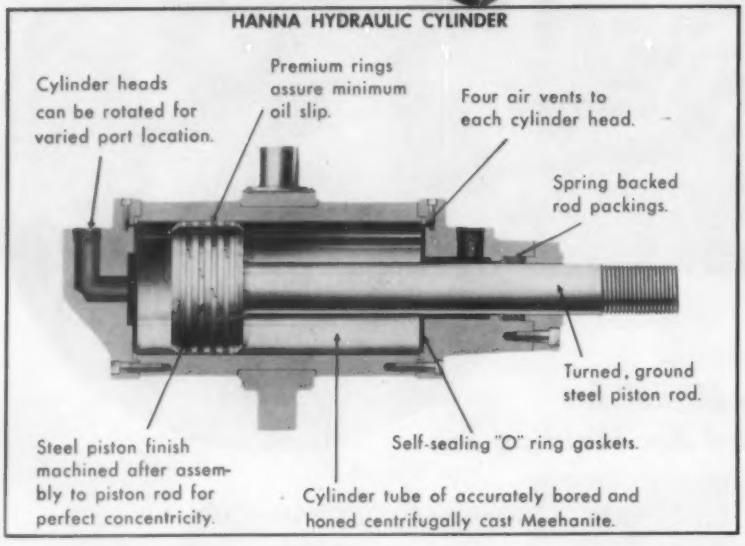
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Cylinder heads can be rotated for varied port location.
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FOR OVER 50 YEARS the Hanna nameplate has signified the finest engineered products. Meeting JIC Hydraulic Standards is nothing new for Hanna High Pressure Hydraulic Cylinders. They have always been designed, engineered and built to insure top-quality, dependable performance.

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manufacturing tools is also covered.

A number of other topics treated in this informative volume are as follows: standards for tolerances on molded articles; mold design and recommended steels; machining, finishing, and decorating; and voluntary commercial standards of the trade.

Compressed Air

COMPRESSED AIR HANDBOOK. Size 9 by 6 in.; second edition, 1954; 384 pp; illustrated; cloth bound. Published by McGraw-Hill Book Company, Inc., 330 W. 42nd Street, New York 36, N. Y. Price $8.00.

MANY INDUSTRIAL applications of air power and related equipment are considered in this informative and extensive guide. This book bears not only on application but also on theory, installation, selection testing and equipment maintenance.

The second edition contains almost double the number of illustrations and descriptions of applications that the former edition had. An entire, new chapter is devoted to centrifugal compressors. This edition contains new developments in maintenance techniques and latest uses of pneumatic power.

For example, in dealing with the compressed air system, the book covers such items as compressor capacity required, number of compressors needed, air distribution, causes, effects and remedies of low air pressure.

Heat Transfer

HEAT TRANSFER AND FLUID DYNAMICS by J. G. Knudsen and D. L. Katz. Size 9 by 6 in.; 243 pp including index; paper or cloth bound. Published by Engineering Research Institute, University of Michigan, Ann Arbor, Michigan. Price $3.50 or $4.50 depending on binding.

TURBULENT AND LAMINAR flow is given attention in the first of three main sections in the book. The flow of fluid past plates, cylinders, spheres, tubes, in annuli and between parallel planes is studied.

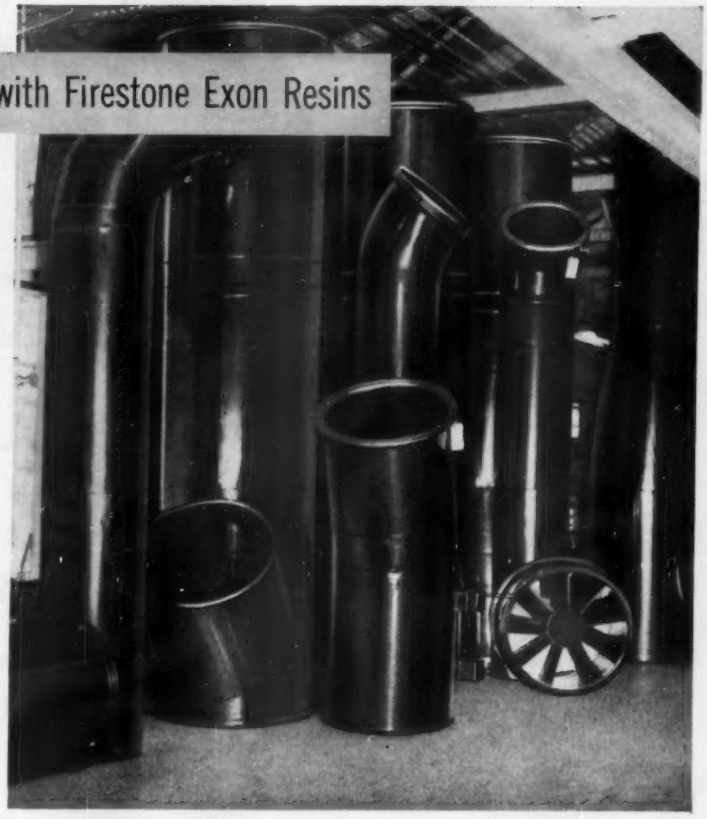
A knowledge of the behavior of fluids is important in some engineering design work. Information pertinent to this is offered in the second section which is devoted to the study of energy dissipation and shows how losses can be figured.

Heat transfer by convection is treated in the last main division of the book. In this portion of the bulletin the significance of fluid dynamics in the study of heat convection is apparent.

It is advisable that prospective readers of the bulletin know calculus and differential equations, for an appreciation of the material.

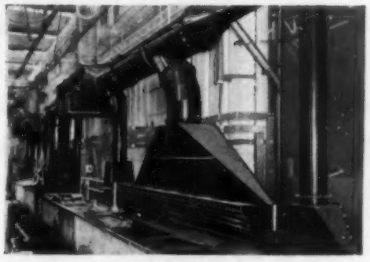
Industry wipes out corrosion with Firestone Exon Resins

Corrosion's on the way out at American Viscose ...QUELCOR* coating does the trick!



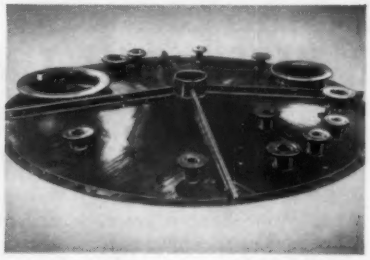
A mixture of *entrained sulphuric acid, carbon disulphide,* and *hydrogen sulphide* was eating away fume ducts at the world's largest rayon tire cord plant at Front Royal, Va. Maintenance costs piled up as protective coatings failed.

The answer was found in Avisco's Fredericksburg plant where heavy duty Quelcor coatings had stopped the ravages of similar corrosives for over a year. This is another example of the successful protection provided by this PVC Plastisol throughout the cellophane, rayon and staple fibre industry.



★ Hoods, ducts and blowers of General Electric's Philadelphia plating plant were being destroyed by *many* corrosives. Quelcor was applied with minimum loss in production time and stopped corrosion dead. The problem of sensitivity of plating solutions was eliminated.

★ Acid fumes have yet to corrode these Quelcor-coated deBothezat exhaust fans at American Enka's Lowland, Tenn. plant. Application to these blowers typifies the successful use of Quelcor by many industries faced with corrosion.



★ Lead-lined chemical reactor heads were no match for the solutions used by General Chemical's Baker & Adamson Works at Marcus Hook, Pa. Since coated with Quelcor, the units have shown no sign of corrosion.

*Quelcor is a product of Quelcor Inc., Chester, Pa.

Corrosion is being wiped out in plant after plant, all over America. From Firestone research come materials that help make this possible. Quelcor, for example, based on Exon 654 Resin, is a dip-coat application that forms a tough, seamless, non-porous film from 1/32" to 3/16" thick with fine abrasion and chemical resistance.

Other versatile Exon polyvinyl chloride resins are the basis for a broad range of corrosion-resistant materials which can be lightweight structural rigids, linings, or coatings. Each has distinctive properties to match your specific corrosion problem.

For details that will interest you in particular, call or write:

CHEMICAL SALES DIVISION

FIRESTONE PLASTICS COMPANY, DEPT. 13J, POTTSTOWN, PENNSYLVANIA

A Division of The Firestone Tire & Rubber Company

Firestone EXON

Note: Firestone supplies the resin only, does not manufacture the end product.

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HERE'S FULL-TIME PROTECTION FOR TEMPORARY CIRCUITS

For temporary circuits needed in construction work and other outside jobs, the Heinemann "Receptacle-Type" Outdoor Service Unit provides on-the-spot power with full circuit protection.

Combining convenient utility with absolute protection, this Heinemann Outdoor Service Unit has wired-in receptacles for tools, pumps, floodlights and other equipment. It's a portable, fully protected service unit that can be carried from job to job . . . without makeshift arrangements. The only connections needed are those directly to the line.

As Heinemann Circuit Breakers employ no thermal elements, current capacity of the unit is not affected by summer or winter temperature extremes—an especially important feature in outdoor equipment.

Should a fault in the line trip the breaker, the user restores current simply by switching the handle to the "ON" position. There is no confusing reset position . . . no need for the power company to make extra service calls.

"Receptacle-Type" Outdoor Service Units are housed in rugged, weather-proof enclosures which may be padlocked to prevent tampering. Plug-in receptacles are on the bottom. Also available with spring-hinged door to enclose receptacles when not in use.

For complete details, write for Bulletin 2013

HEINEMANN ELECTRIC CO.

128 PLUM STREET • TRENTON 2, N. J.

HEINEMANN Circuit breakers

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BULLETINS

(Begins on page 21)

155 Guide to Clamps—Catalog 19, 32-pp, describes the Jorgensen and Pony line of clamps. Lists and describes over 40 styles of "C" clamps, bar clamps, handscrews, press screws, and similar tools. New hinged clamps, as well as the steel track in which they may be mounted for sideways adjustment, are presented. Catalog contains helpful illustrations and sketches as well as "how to—" editorial matter on selection, care and use of clamps. Adjustable Clamp Co.

156 Oil Fog Lubricators—Illustrated Form 496 presents a company's new Micro-Fog lubricators for air tools, other air equipment. Wide range of air flows, adjustability, control of oil feed and other advantages of these lubricators are discussed briefly. Includes dimensional and capacity data for oil and tank types. C. A. Norgren Co.

157 Buying Screw Machine Parts — This slide-rule type calculator can help plant engineers make quick stock replacement estimates on aluminum for screw machine parts. Gives amount needed for 1000 screw machine parts with combination dimensions from ¼ to 3 in. in lengths and ⅛ to 3½ in. in diameter. Gives pounds-per-foot, feet-per-pound and fractions-to-decimal equivalents for round and hexagon stock. Also lists mechanical properties for aluminum screw machine stock. Kaiser Aluminum & Chemical Corp.

158 Improved Quenching Oil — A new quenching oil with thermal stability and high boiling range, particularly suitable for quenching systems requiring a high flash-point, is described in Form A-3073. Discusses advantages of this quenching oil and includes specifications. Sun Oil Co.

INDUSTRIAL WASTE HANDLING

159 For Metal Finishing Wastes—Technical Reprint T-123 discusses methods of treatment for plating waste, the use of ion exchange in the plating room, relative advantages of batch and continuous treatment and economic factors, among other phases of the plating industry. The paper is illustrated and has several graphical representations of the problems discussed. Graver Water Conditioning Co.

160 White Water Treatment—The savings realized from, and several types of equipment used in, white water treatment are discussed in 8-pp Technical Reprint T-122. The article deals with the methods of white water treatment, types of equipment used and limiting factors in the use of each type. There are detailed illustrations of equipment, a discussion of each type and detailed economic calculations showing costs and savings possbile through use of white water treatment. Graver Water Conditioning Co.

161 Sanitary Screening Equipment — Book 2587, 28-pp, describes a line of screening equipment for efficient removal of solids from water, sewage and industrial waste. Gives complete dimension and specification data for four types of coarse screens for removing large solids, and three types of fine screens (with screen cloth) for removal of small solids. Tables to determine proper size unit for handling various capacities are included. Contains over 30 photos of screening installations, and information on applications. Link-Belt Co.

MECHANICAL POWER TRANSMISSION

162 Cam Clutches — Illustrated Catalog C11-54 A, 8-pp, contains general information on company's cam clutches, including cutaway views, operating functions, line drawings, design features and ordering information. Four illustrated catalog sheets listing specifications, installation procedures and lubrication information accompany the folder. Morse Chain Co.

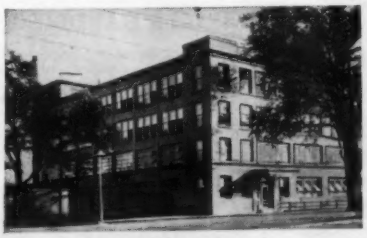
163 Air Clutch—Compact Bulletin A-634 contains information on company's new Air-

What this change did...

Woolson Spice Company, Toledo, Ohio; H. A. Spieker, Contractor

"Owens-Illinois Glass Block* cut absenteeism because of colds 90%, reduced heating costs 40%, improved building appearance"

Here's what Mr. N. L. Schmid, president of The Woolson Spice Company, says about this installation: "In the Fall of 1952 our company replaced worn-out and unsightly window sash in our principal building with panels of Owens-Illinois Glass Block. The transition from the old to the new was without inconvenience; and, as a result of this remodeling, a careful check has shown that through eliminating drafts, *our absenteeism, because of colds, has been reduced ninety per cent.* Complaints from the stenographical unit ceased as to improper light. Economically, a very substantial saving has resulted in the reduction of the expense for heat. It is estimated by our General Superintendent that the *heat expense* item in our overhead has been *reduced forty per cent.* In addition to our satisfaction as to benefits from Owens-Illinois Glass Block, there also comes the pride in the *improved appearance of our building* that was so quickly changed from old-fashioned to a modern appearing structure."



BEFORE
Owens-Illinois Glass Block

N. L. SCHMID
President, Woolson Spice Company

If you are in the process of remodeling old structures or building new ones, don't overlook the positive advantages that panels of Owens-Illinois Glass Block bring. For information and help with your plans, write Kimble Glass Company, subsidiary of Owens-Illinois, Dept. PE-1, Box 1035, Toledo 1, Ohio.

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BULLETINS

(Begins on page 21)

Grip clutch. Lists outstanding features, explains ease of operation, and provides cross-section drawing showing construction. Besides information on air control and release valves, this bulletin gives tabular data on clutch sizes, dimensions, bore sizes, weights and prices. Dodge Mfg. Corp.

164 Fluid Couplings—Bulletin 144-D, 14-pp, presents complete installation and performance data on fluid couplings. Illustrated with diagrams and drawings, bulletin shows ease of applying company's fluid couplings on any type industrial equipment, powered by any type electric motor or internal combustion engine from ¼ to 850 hp. Describes standard models providing standard input, output combinations, and standard models in packaged units. Installation hook-ups are given, along with typical on-the-job applications in various industries. Twin Disc Clutch Co.

165 Malleable Couplings—This 16-pp illustrated folder describes company's line of malleable pipe couplings and fittings. Thirty photos demonstrate savings in time and labor made by Rolagrip couplings for plain end pipe and Gruvagrip and Gruvajoint couplings for grooved pipe. Diagrams and specifications are included. Gustin-Bacon Mfg. Co.

166 Split Ball Bearings—Twenty-four page Catalog 54 describes company's line of split ball bearings. Load and speed ratings are given, as well as design data and dimensions. Describes single and double row ball bearing bushings in thin section; fully split heavy duty pillow blocks; fully split heavy duty ball and roller bearings; thin section instrument bearings in torque tube dimensions, and heavy duty metric series ball bearings. Information on various design features possible by fractured race bearings is also included. Split Ballbearing Corp.

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TWO WAY PROTECTION. This installation of Hot-Dip Galvanized chain link fence will give you double protection. It will serve the primary job of protecting your property. Secondly, and a very important factor, is that once this fence is installed there will be no necessity for costly maintenance. It's Hot-Dip Galvanized to give you the utmost protection. This galvanizing is done *after* fabrication, thus avoiding the possibility of any part of the steel being exposed.

A thick, uniform coating means complete protection for you. Sealed in zinc, this fence will not rust.

When you have a rust problem, choose Hot-Dip Galvanizing, the best rust protection you can buy. For the best in galvanizing, send your products to a member of the American Hot Dip Galvanizers Association . . . he has the know-how to give you a top quality job.

Send today for our new booklet "Stop Rust." It gives you the full story on the process, plus a comprehensive coating comparison chart. "Must It Rust" 16 mm film available for showing.

AMERICAN HOT-DIP GALVANIZERS ASSOCIATION

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For more facts circle 617 on Reply Card

Among this Month's New Literature of Merit . . .

167 Physical Properties of Synthetic Organic Chemicals—In 24 pages, booklet F-6136 presents the latest data on more than 350 organic chemicals. It features 46 new products available from this company. For easy reference, chemicals are arranged by family groups with condensed application data. Physical properties are given in tabular form. An alphabetical index is included for the convenience of the user. Carbide and Carbon Chemicals Co., Union Carbide and Carbon Corp.

168 Manual on Insulated Cables—Bulletin OK-1085, 128 pp, provides complete data on Okolite-Okoprene 0- to 5000-v unshielded, rubber-insulated Neoprene-sheathed cable. As this cable is commonly used by industrial and utility plants for low voltage power and control circuits, the current carrying capacity tables, short circuit curves, voltage regulation formulas and methods for determining conduit sizes, pulling tension and bending radii should prove extremely useful. Also included is discussion on advantages of cables not requiring shielding for 4160-v operation. Main sections of this book cover construction features; engineering information; installation and handling techniques; splicing and terminating procedures. It is available to qualified plant engineers. The Okonite Co.

169 Why Abrasive Wheels Fail—Titled "Why Do Abrasive Cut-Off Wheels Fail (Sometimes)?" this 40-pp pocket-size booklet not only gives reasons for failure but also explains how to prevent this failure. Covers such factors as speed, blade size, bearing life, power requirements, work holding devices, and wheel spoilage. Also included in this reference booklet are photos and descriptions of several types of machines. Wallace Tube Co.

170 Precision Instrument Components—Besides illustrating a complete line of precision shafts, gears, collars, couplings, differentials and other equipment, 64-pp pocket-size Catalog 5 provides full dimensions for design and detail layout. Gives complete tolerance specifications to enable mounting of associated equipment. Through use of these precision items with breadboard equipment, a plant engineer can prove out his design and schematics. Also included is drill and tap reference data, typical assemblies. PIC Design Corp.

171 Rubber Seal Handbook—Bound with a heavy cover, this 82-pp handbook is the second issue of company's comprehensive technical publication in the rubber seal and gasket field. An opening section deals with company's techniques and facilities. Subsequent sections treat industry standards, specifications, and testing in the rubber field together with general information, uses, charts and specifications for various types of industrial seals. Includes a description of custom molding operations, use of leather back-up washers, silicone rubber and charts and tables used in machinery design. A final section defines rubber terminology. Available to qualified plant engineers, please state your job title when requesting this. Minnesota Rubber and Gasket Co.

MATERIALS HANDLING

172 Truck Procurement Plan—Circular SP-1036, 6 pp, explains this manufacturer's six-way plan for procurement of industrial trucks. Covers the lease program, time payment, short term rental, and trial plans, trade-in program, and outright purchase. Pictures several models and gives cost comparison figures showing outright purchase price, time payment terms and rental cost. Lewis-Shepard Products, Inc.

173 Straddle Carriers—Titled, "One Truck Fleet," this new 16-pp booklet uses photos and the case-history approach to describe straddle carrier applications in 22 plants in 10 industries, including steel, metalworking, food and others. Gives dimensions and speeds for several models of these carriers with load capacities from 10,000 to 50,000 lb. Ross Carrier Div., Clark Equipment Co.

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- **Applies the cleanser, scrubs, and picks up — *all in one operation***
- **Mounts a SELF-STARTING gasoline engine**

This *all-in-one* cleaning unit, *Finnell's 218G,* is indeed the answer to today's need for increasing output per man-hour on vast-area scrubbing. *The 218G completely mechanizes scrubbing* — applies the cleanser, scrubs, and picks up — *all in one operation!* Independence from power lines permits the machine to go wherever the operator guides it . . . working in and out of production areas with ease . . . *scrubbing continuously.* Thus the *218G* is capable of cleaning up to 16,000 sq. ft. per hour!

Maintenance men appreciate the labor-saving features of this unit. The gasoline engine starts quickly and easily by pressing the starter button (eliminates rope-pulling). And there are no switches to set for *fast* or *slow* — slight pressure of the hand on clutch lever adjusts speed to desired rate (up to 136 ft. per minute). Two 18-inch brushes give a 36-inch scrubbing surface. *One engine* (2 cyl., 4 cycle, 9.4 hp., air-cooled) operates all working parts. The powerful vac performs quietly. Gasoline only is used for fuel — no mixing required.

Whatever the area of your floors, find out what *you* would save with a *Combination Scrubber-Vac. Finnell* makes a full range of sizes, including *electric* as well as *gasoline* models . . . available on lease or purchase plan. It's also good to know that *a Finnell Floor Specialist and Engineer is nearby* to help train your maintenance operators in the proper use of *Finnell Equipment* and to make periodic check-ups. For demonstration, consultation, or literature, phone or write nearest *Finnell Branch* or Finnell System, Inc., 5301 East St., Elkhart, Ind. Branch Offices in all principal cities of the United States and Canada.

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Originators of Power Scrubbing and Polishing Machines

Everything FINNELL for Floor Care

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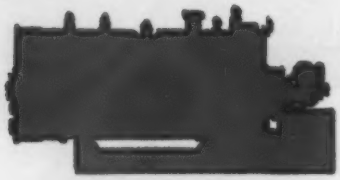
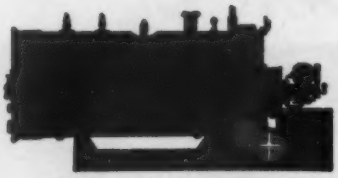
HOW SUPERIOR SOLVES YOUR STEAM PROBLEMS



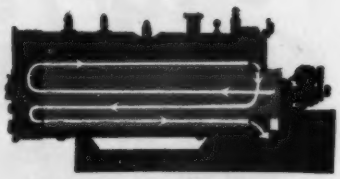
A COMPLETE PACKAGE

Completely factory-assembled and tested, a Superior Steam Generator is backed by undivided responsibility.



INDUCED DRAFT THAT'S BUILT-IN

...eliminates need of an expensive chimney... Multiple fans draw evenly on all tubes, reducing maintenance.

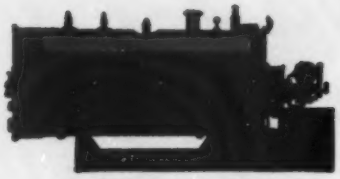


4-PASS, DOWN-DRAFT DESIGN

High gas velocities produce high efficiency. Down-draft design promotes rapid evaporation, quicker steaming.

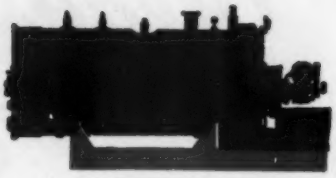
AMPLE HEATING SURFACE

A minimum of 5 sq. ft. of heating surface per boiler horsepower assures maximum efficiency at full rated capacity.



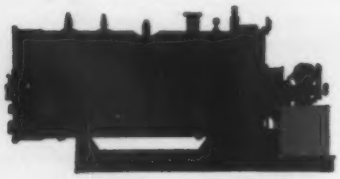
RESERVE CAPACITY

Greater steam space and large evaporating surface provide ample reserve capacity & better than 99% dry steam.



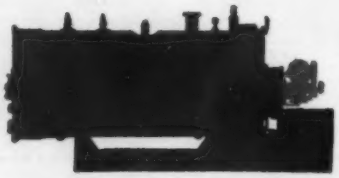
NO EXPENSIVE FOUNDATION

Built on a rigid channel iron base, a Superior Steam Generator needs only a floor capable of supporting its weight.



BUILT-IN CONTROLS

All controls essential to completely automatic operation are factory-wired into an easily accessible control panel.



BURN OIL, GAS, OR BOTH

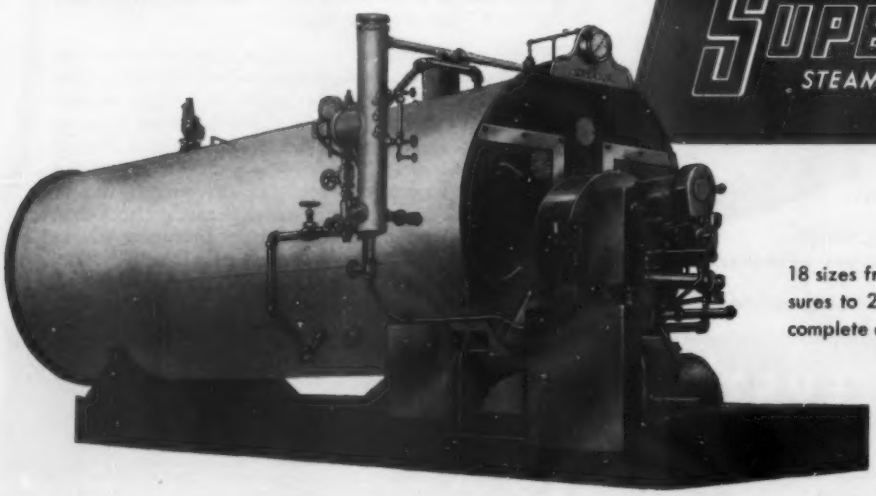
Superior Burners burn oil or gas or a combination of both... changing from one fuel to the other in seconds.

Superior Steam Generators are the ideal choice for a new steam plant... the simplest answer to expanding your present plant... the easiest solution to replacing obsolete boilers.

Guaranteed to develop maximum rated capacities at thermal efficiencies in excess of 80%, their design embodies features which insure long-lived dependability and maximum fuel economy.

for performance you can **BANK** *on*

SUPERIOR
STEAM GENERATORS



18 sizes from 20 to 600 b.h.p. for pressures to 250 p.s.i. or for hot water. For complete details write for Catalog 705.

SUPERIOR COMBUSTION INDUSTRIES INC. TIMES TOWER, TIMES SQUARE, NEW YORK 36, N.Y.

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BULLETINS

(Begins on page 21)

174 Crawler Tractor — Features of company's HD-9 diesel-powered crawler tractor are shown in a 3-pp cutaway view which highlights illustrative material in this 30-pp catalog. Tells the engineering, mechanical and operating story of the HD-9, illustrating the tractor's versatility and performance ability with numerous photos. Allied equipment and special accessories are also pictured. Tractor Div., Allis-Chalmers Mfg. Co.

175 Vibrating Conveyors—Twelve-pp Bulletin 111 describes self-cleaning, vibrating conveyors designed to operate at the natural frequency of their springs. Explains how application of this principle results in several operating advantages including reduced maintenance, greater capacity, lower power requirement, no dampening under load, gentle conveying action, others. Several installations of these conveyors are pictured. Carrier Conveyor Corp.

176 For Overhead Conveying — Eight-pp Bulletin MPC-4 describes and pictures an overhead chain conveyor of simple design and bolted construction, offering flexibility of use, economy of installation. Track, trolley, drive unit and idler curve, and chains are discussed in detail and some typical applications are pictured. The Multi-Plane Chain Corp.

177 Vulcanized Fibre Receptacles—A complete line of hard vulcanized fibre trucks and receptacles for efficient maintenance and supply handling is described in this 12-pp pocket-sized catalog. A variety of long-wearing receptacles for waste paper handling and easy transport and storage of supplies is included. National Vulcanized Fibre Co.

178 Wire Rope Assemblies—Catalog 5201, 22-pp, describes company's wire rope assemblies, used for operating controls, as a part of machinery and equipment, or for slings and hoists. Gives general applications for various types of wire rope assemblies, and includes specifications, ordering details. Macwhyte Co.

179 Conveyor Belt Control—The Guidler, a control mechanism for new and existing conveyor belt installations, is described in this bulletin. Discusses importance of belt control and explains how the Guidler is an adaptation of the hyperbolic principle to this and other material handling problems. Includes selection chart, description of component parts, and mounting instructions. Knapp Mills Inc.

METALS

180 Stainless Steel—A description of company's Stainless 20 and 20-Cb is contained in this 24-pp revised catalog, which gives recent information on steel's corrosive resistance, applications and working characteristics. Several pages record the alloy's resistance to various corrodents. Field reports describe its performance under varying corrosive conditions. Physical and mechanical properties are given, as well as a listing of the various forms and shapes available. A preface briefly explains role of rare earth elements in Stainless 20. Alloy Tube Div., The Carpenter Steel Co.

181 Test Bars—Plant engineers concerned with copper and aluminum alloy casting will be interested in 18-pp Bulletin 168. Discusses current test bar theory and practice. Design of test bar patterns, production of test bars (melting, pouring, heat treatment), testing procedures and other subjects are explained and illustrated. Federated Metals Div., American Smelting and Refining Co.

182 Conversion Guide—This chart describes the Aluminum Designation System, including both old and new designations for easy conversion, and gives in detail the workings of the four digit index system. Printed in three colors on durable coated stock, the chart is suitable for tacking on wall or filing under glass. Peter A. Frasse and Co., Inc.

183 Clad Steel Economies—Dollars-and-cents data on economies possible in the use of clad steel plates are contained in 6-pp Form 718. Discusses 16 standard alloy claddings on a variety of backing steels and shows how to realize significant savings in equipment costs. Lukens Steel Co.

184 Engineering Irons — Bulletin A-69, 28-pp, presents characteristics of modern nickel cast irons and illustrates their broad uses in industry. Tables, charts, and photomicrographs show how use of nickel, alone or with other alloying elements, helps to control engineering properties of cast iron to meet service requirements. Tells how modern alloyed irons with their improved physical and mechanical properties can be produced by most foundries. The International Nickel Co., Inc.

OTHER EQUIPMENT

185 Steam Generator—This manufacturer's new Type D steam generator, a packaged unit for pressure firing with gas, oils or combination of fuels, is described in an 8-pp catalog. Gives complete data and dimensions on this water tube generator which is available in 17 sizes with capacities from 8000 to 40,000 lb of steam per hour. Fully illustrated, booklet explains economical steam production, low installation cost, other advantages. Provides details on controls and combustion equipment offered. Superior Combustion Industries Inc.

186 Reinforced Plastic—This 6-pp technical brochure introduces a glass filament reinforced plastic available as formable sheet stock. Explains how this isotropic laminate is made, and advantages offered. Gives physical, and electrical properties, data on chemical resistance. Also includes comparison data on strength and stiffness properties and strength-weight and stiffness-weight ratios of glass reinforced laminates and other structural materials. Minnesota Mining & Mfg. Co.

187 Hydraulic Cylinders—Illustrated Catalog 54-68, 8-pp, describes company's compact hydraulic cylinders. Cutaway photos showing design features and installation drawings for five cylinder styles are included. Provides cylinder dimensions for standard bore sizes from 1½, to 6 in., and for heavy-duty rod ends and piston knuckles. Charts for determining piston areas, piston speeds and output forces for cylinders are included, as well as schematic diagrams illustrating principles of differential oil-hydraulic circuits. Vickers Inc.

188 Finishing Oven Efficiency — Eight-pp Bulletin 954 describes finishing systems for baking and drying industrial equipment. Outlines features to look for when buying a finishing oven and includes six case histories showing how various manufacturers solved finishing problems. Michigan Oven Co.

189 Accessories for Hose, Duct—Accessories facilitating installation of company's hose and duct are described in illustrated Bulletin 41. Shows use of screw couplings, soft-end cuffs, and flanges for assembling hose in long lengths, attaching it to pipe of varying sizes, connecting to outlets of different shapes, and applying to equipment. The Flexaust Co.

190 What's New In Compressors—"Recent Advances in Engine and Compressor Design," is an illustrated article telling how higher power output has been achieved with lower fuel consumption and lessened cooling requirements. Also describes a new type of turbocharger and a new engine particularly designed for turbocharging. Included in this 10-pp booklet is another article covering operating economy achieved by a turbocharged compressor on a gas transmission pipeline. Clark Bros. Co.

191 Epoxy Resin Adhesives — This 16-pp brochure contains technical data and price information on company's epoxy resin adhesives, formulated for bonding problems involving such materials as metals, wood, glass, ceramics, hard rubber, and thermosetting plastics. Also contains information on new epoxy resin formulations with exceptionally low shrinkage and excellent electrical properties, for use in encapsulating electrical components and for potting, impregnating or laminating work. Test data and specifications are included. Armstrong Products Co.

192 Chemical Cleaning of Piping Systems—The advantages of chemical cleaning of service and product lines are outlined in this illustrated bulletin. Shows how chemical cleaning eliminates waste due to inefficient methods, replacement, and describes company's methods of chemical cleaning. Includes case histories of successful cleaning operations. Dowell Inc.

DATA FILE of literature for the plant engineer's library

STANDARD CATALOGS, bulletins and handbooks are listed to help plant engineers maintain a permanent data file. To get these free catalogs, circle item numbers of those wanted on postage-free cards provided for you on pages 169-170.

MATERIALS HANDLING

301 Overhead Handling Equipment—Booklet 2008-K, 12 pp, is the current edition of this company's engineering and application data booklet covering overhead materials handling equipment. Describes and illustrates track drives, cranes, electrification, buckets, grabs, Cleveland Tramrail Div., The Cleveland Crane & Engineering Co.

302 Engineered Monorail Applications—A file of application literature is announced as the beginning of a new service. Includes a technical booklet on automatic dispatch systems and an equipment bulletin in addition to several case studies of installations. As they are completed new groups of case studies will be sent to holders of file. Available to qualified plant engineers. The American MonoRail Co.

303 Locomotive Cranes—Catalog 84, 16 pp, stresses advantage of the torque control unit used in company's cranes and features illustrations of the mechanism and converter unit. Describes in detail the sealed, anti-friction bearings, air controls, brake, limit switch and other components. Orton Crane & Shovel Co.

304 Sheet Lifter — Operational and design features of company's sheet lifting equipment, which contributes toward efficient handling, flexibility and economy are explained in Bulletin S-25, 16-pp. Cullen-Friestedt Co.

305 Pneumatic Handling System—Of value to plant engineers concerned with handling of dry pulverized materials, 16-pp Bulletin G-2 tells how handling costs can be reduced by using the proper pneumatic handling system. Lists 86 dry pulverized materials and indicates which of three systems is best suited to handle each material. Discusses company's system for conveying such materials as Portland cement, pulverized coal, limestone dust, fly ash, pulverized phosphate rock, and others. Presents advantages of Airveyor and Airslide systems. Fuller Co.

307 Conveyor and Elevator Belting Tips—This 32-pp manual on installation, maintenance and care of conveyor and elevator belting, uses photos and drawings to show ways to improve belt service and lengthen belt life. Includes a discussion of belt design, covers, reinforcements and grades. Repair methods, splicing, and fastenings are also covered, and there's a table listing common conveyor belt maintenance problems with their cause and remedies. The B. F. Goodrich Co.

309 Conveyor Trolleys — A new line of ball bearing trolleys for overhead conveyors is covered in 20-pp Book 2536. Contains specification data for the selection of new trolleys, or of replacement trolleys for existing installations. Describes many features resulting in low operating and maintenance cost, such as ball bearings with ground raceways, and machined and hardened treads.

DATA FILE

(Begins on page 171)

Includes application and maintenance information and a description of attachments commonly used. Twelve overhead trolley installations are illustrated. Link-Belt Co.

310 **Conveyor Belting** — Folder 54-3, contains a capsule description of construction, types of treated stitched canvas belting for all conveying and elevating applications. Describes company's general conveyor and elevator belt, oil- and acid-resisting belts to handle hot materials to 600 F. Imperial Belting Co.

311 **How to Pick a Truck**—Catalog 54, 8 pp, features a step-by-step procedure for making the best fork truck choice for a particular handling job. Other sections in the booklet show at a glance complete specifications on each of company's trucks, and illustrates important construction and design features. The Baker-Raulang Co.

313 **Shovel and Loader**—Described in 12-pp Bulletin 1932 is a hydraulic crown and hoist shovel and loader incorporating mechanical features usually associated with big shovels. Illustrates, gives specifications, application information on both pneumatic traction and crawler traction models. Dempster Bros., Inc.

314 **Shock Absorbing Casters**—Twenty-pp Catalog FH-53 describes construction features of company's Floating-Hub casters, listing types and mountings now available. Load ratings for each type and size are provided. Stresses, by text and illustration, how these shock absorbing casters work, permit smooth travel over rough floors. The Bassick Co.

315 **Freight Elevators**—Elevators designed especially for power truck loading are described in this 8-pp illustrated bulletin. Discusses various requirements for impact, off-balance, and extra static loading and shows how design and structure of company's elevators meet requirements. Otis Elevator Co.

MAINTENANCE

316 **Tar Base Coatings**—Now available is a collection of five bulletins on company's 100 series of cold applied tar base coatings. One bulletin gives general information on the full line and provides an application chart. The others give detailed specifications and application information on the various types. These include a coating for protection against severest corrosive conditions; a thin high gloss coating for general maintaining purposes; a coating for protection against generally severe corrosive conditions; and one for water tank interiors. Pittsburgh Coke & Chemical Co.

317 **Hot-Dip Galvanizing**—How hot-dip galvanizing is prolonging life of industrial equipment is stressed in this 16-pp booklet. Photos showing galvanized equipment in use accompany brief text explaining how this process of covering iron and steel with a protective coating of zinc serves to prevent rust. The galvanizing procedure is explained and illustrated. Coating comparison charts show how hot-dip galvanizing compares with other types of coatings as to rust resistance, dimension limits, shock resistance, initial and maintenance costs. American Hot-Dip Galvanizers Assn., Inc.

319 **Guide to Rust Prevention**—The 24-pp 1954 edition of this company's general catalog provides a treatise on rust prevention. Features 94 color chips of manufacturer's products and includes instructions for surface preparation and application of primers, short- and long-oil types, machinery and implement finishes, chemical and heat resistant types, sealers, oil field finishes, thinning oils and floor and masonry coatings. Presents a restful color group of finishes for plant interiors; also describes special finishes. Rust-Oleum Corp.

320 **Building Maintenance** — Handbook 7 offers 64 pp of information on floor surfacing, leak stoppers, external wall sealants, road-patching, roofing materials. Includes instruction for use. Flexrock Co.

321 **Proper Care of Floors** — Filled with what-to-use and how-to-use-it information, this 32-pp booklet is a well written, practical text on floors. Presents floor preservation as a triple process involving cleaning, sealing and maintaining. Discusses various floor surfaces and their special problems. Gives helpful hints on floor maintenance and provides a handy chart covering preparation procedures and products for 12 common floor surfaces including cement, wood. West Disinfecting Co.

322 **Combination Scrubber-Vacuum** — A single unit that applies the cleanser, scrubs, and picks up—all in one operation—is described in this illustrated literature. Gives full specifications for company's Model 213P for large area floors, and gives various methods of combination-machine-scrubbing suggested for hard, soft, oily floors. Also covers units for smaller and larger operations in gasoline-powered as well as electric models. Finnell System, Inc.

324 **Vacuum Cleaning Equipment**—Vacuum cleaning units to suit requirements for commercial buildings, industrial plants and buildings where noise is objectionable are listed in illustrated Bulletin 152. Also shown are furnace cleaners, units for emptying sump tanks, and special units. The Spencer Turbine Co.

325 **Light Scaffolds**—This series of illustrated bulletins describes company's line of aluminum alloy up-right scaffolds and accessories. Pictures one-piece sections and multi-section models with various ranges of adjustability. Points out such features as locking hooks which provide automatic security and locking casters for safety on stairways and inclines. Up-Right Scaffolds Div., Up-Right, Inc.

CONSTRUCTION

326 **Translucent Structural Panels**—Bulletin 533, 12 pp, describes Resolite, a translucent structural material, corrugated or flat, molded of thermosetting polyester resins reinforced with woven glass fibers. Illustrates use of Resolite in partitioning, skylighting and decorating installations. Provides standard sheet specifications, general information on colors, weights, light transmission, thicknesses. Resolite Corp.

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Giddings & Lewis Machine Tool Co. has the Precast Stone Models.

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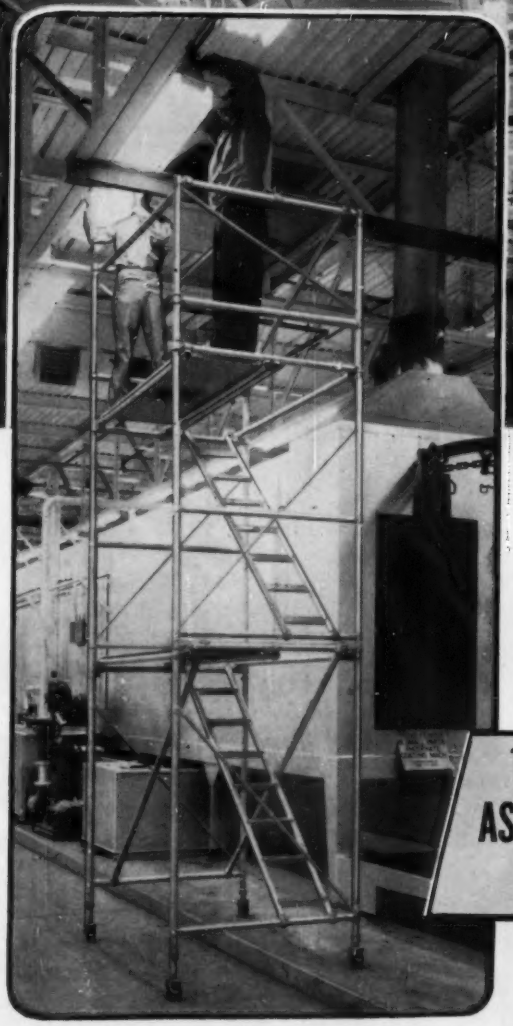

Up-Right scaffold provides the most economical and practical means to maintain overhead equipment in any plant, large or small. A tower of any height desired is ready in minutes. Individual 1-piece sections are unfolded and set one on top of the other. They lock into place instantly . . . no tools, wing nuts or bolts.

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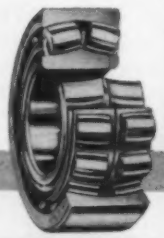

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BEARINGS AND
PILLOW BLOCKS

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DATA FILE

(Begins on page 171)

327 **How to Glaze with Plexiglas**—Sixteen-pp Booklet PL-23 gives detailed information on glazing industrial and other buildings with flat panels of the acrylic plastic Plexiglas. Written for plant engineers concerned with frequent breakage of windows or other glazing problems. Gives properties and behavior of this sheet. Plastic Dept., Rohm & Haas Co.

328 **Glass Block Fenestration**—The natural ventilation characteristics of glass block fenestration are presented in this illustrated report of a test project. In some 88 pages, report covers sun hoods, window types, dual outlets, air speeds, double loaded ventilation below window sill. Test data is summarized and recommendations included. Although test was conducted on glass block fenestration in school buildings, the information will be of interest to those concerned with industrial applications of glass block. Kimble Glass Co.

329 **Basic Roofing Information**—"What You Should Know About Your Roof" is a 40-pp clearly illustrated booklet which tells what makes a roof fail, how to recognize signs of roof deterioration, what to do to keep a roof in good condition. Discusses recommended roofing practices, essentials of a good re-roofing job, also special features of company's roofing materials. Johns-Manville.

330 **Non-Slip Flooring**—Algrip, an abrasive rolled steel floor plate described as non-slip even on steep inclines, is the subject of Booklet A-5, 8 pp. Discusses safety features; gives fabricating data, sizes, allowable loads. Alan Wood Steel Co.

331 **Industrial Doors**—Vertical lift, turnover doors, and crane doors are described as to operation and application in this 8-pp illustrated bulletin. Full specifications are provided, also a guide to door type selection. International Steel Co.

LUBRICANTS, LUBRICATION

332 **Bearing Lubrication**—Vol. XL, No. 10 of this company's Lubrication magazine provides an excellent 12-pp article on industrial bearing lubrication. Illustrated with photos and drawings, text covers such subjects as bearing design; bearing surfaces; bearing overhaul; aspects of lubrication, including factors involved in choice of turbine oils and diesel lubricants, and the effects of moisture; and the life expectancy of bearing lubricants. The special requirements of porous bearings are also discussed. The Texas Co.

333 **Automatic Lubrication** — Sixteen-pp Catalog L-52 describes force feed lubricators for all types of machinery. Illustrated, gives full design and construction details on company's open and enclosed type lubricators, available in capacities from 2 to 32 units with 1 to 24 feeds per unit. Hills-McCanna Co.

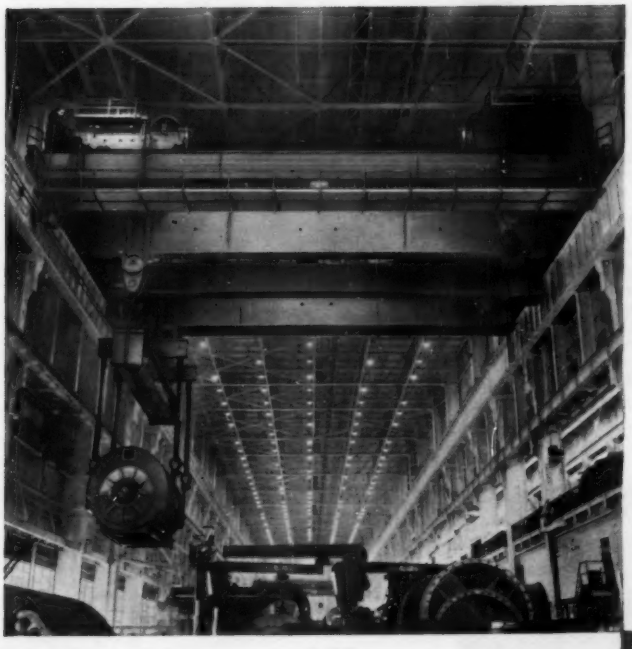
334 **Force Feed Lubricators**—12-pp Catalog 25 G describes and pictures company's new Model 25 lubricator, a popular priced, general purpose unit adaptable to many applications. Lists machines for which it provides economical, automatic lubrication. Discusses drive arrangements. Manzel Div., Frontier Industries, Inc.

335 **"Dag" Dispersions at Work** — How "dag" colloidal dispersions serve industry is told in 12-pp illustrated Catalog 460. A table lists 40 basic dispersions of graphite, molybdenum disulfide, vermiculite, and zinc oxide in various carriers. Comparative particle size and consistency of each dispersion is given, as well as typical uses. Acheson Colloids Co.

337 **Centralized Lubrication** — Pocket-sized 24-pp, Form 34-22, called "Ask Anyone in Industry" describes in comic-book form the hazards and inefficiency inherent in conventional lubrication practice and promotes use of centralized lubrication—in the form of Alemite Accumeter measuring fittings. Shows how these are connected by tubing to a lubrication pump controlled by an automatic timer. Alemite Div., Stewart-Warner Corp.

339 **Spray Lube System**—This 8-pp illustrated bulletin describes company's method of single and multi-point application of liquids to a wide range of metal cutting and form-

heavy handling costs less WITH A Whiting Crane!



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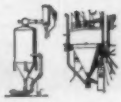

For more facts circle 623 on Reply Card

DATA FILE

(Begins on page 171)

ing operations. Tells how it works and records results of various tests, as well as pointing out advantages. C. A. Norgren Co.

PUMPS, COMPRESSORS

340 **Compressors** — Bulletin A72, 36 pp, gives construction, operation information on company's Class WN-114 heavy-duty air compressors. Illustrates seven models of compressor as a single unit for displacement capacities from 1186 to 1948 cfm, twin units furnishing up to 3896 cfm. Joy Mfg. Co.

341 **Hydraulic Pumps** — Eight-pp Bulletin DP-300 gives features, selection data for company's dual-vane hydraulic pumps. Illustrations include drawings, cut-away photos and performance data charts. Dudco Div., New York Air Brake Co.

342 **Installing a Pump** — Blaming many pump operating troubles on improper pump selection and installation, this 8-pp technical article tells what should be taken into consideration when ordering a pump. Titled "Studying the Installation," it discusses head, viscosity, pipe friction, suction lifts, horsepower and materials. Illustrated. Viking Pump Co.

343 **Circulating and Coolant Pump**—Form 7074-D, 20-pp, shows a line of Motorpumps with totally enclosed motors. Arranged for easy selection, a pictorial index helps to locate pages describing size and type of pump desired. Data provided includes performance curves, cross-sections, dimensions, descriptive material for each particular pump class. Horizontal and vertical units are described in fractional and integral horsepower sizes, as are cradle and flange mounted units meeting JIC standards. Ingersoll-Rand Co.

344 **Vertical Pumps**—Bulletin B-1700, 12-pp, presents four features which distinguish close coupled vertical pumps and suggest their use in transfer of process liquids and water—flexibility of construction; adaptability to pumping system's present available NPSH; space saving design; and availability in both transfer-type and process-type construction. Includes many diagrams and full specifications. Peerless Pump Div., Food Machinery and Chemical Corp.

PACKINGS, GASKETS, SEALS

345 **Packings and Gaskets**—In this 40-pp belting and packing manual (NY-2697-P) are helpful charts plus information on the care, use and maintenance of rod and sheet packings and gaskets. A complete engineering section contains all necessary charts and tables for determining working specifications of packings. Also included are packing recommendation charts. New York Belting and Packing Co.

346 **Buyer's Guide on Packing**—Twenty-pp Catalog PC-101 brings together all material on company's Palmetto packings and includes data on packing for liquid pistons on inside-packed piston pumps. Greene, Tweed & Co.

347 **Packings for Chemicals**—Dura Plastic Teflon packing for sealing applications in the handling of corrosive chemicals is introduced in Bulletin 461 M. D. Stresses heat resistance of the material, chemical inertness. Discusses construction details and lists packings for use with specific chemicals. Durametallic Corp.

349 **Braided Packing**—Illustrated 8-pp Bulletin A-131 describes manufacturer's Lattice Braid rod and shaft packings. Points out construction features, and discusses available materials, sizes and forms. Also contains service reports from users, and includes service recommendations. The Garlock Packing Co.

MECHANICAL POWER TRANSMISSION

350 **Power Transmission Equipment**—Form 118, 24 pp, gives descriptive and technical information on variable speed pulleys, wide V-belts, sheaves, motor bases, countershafts, and Select-O-Speed transmissions. Illustrated with photos and dimensional drawings, booklet provides ratings, sizes, application and installation tips. Lovejoy Flexible Coupling Co.

351 **Flexible Couplings** — Condensed Engineering Catalog 51-A contains excellent data on the choice and use of company's flexible metal couplings. Tells advantages of these couplings and discusses design principles. Double-flexing and floating shaft types, light duty couplings and types for special applications are described and pictured in detail. Thomas Flexible Coupling Co.

353 **Adjustable V-Belt** — This 8-pp catalog covers company's new Veelos TD and TE v-belt designed to reduce installation and operation costs on big drives. Studs, cup-washers and T-screws of the belt are illustrated, and installation and operation characteristics explained. Booklet includes directions on how to measure, to couple and uncouple, and to install. A table shows correct lengths for these belts. Manheim Mfr. & Belting Co.

354 **Roller Chains, Sprockets**—Catalog 754, 64 pp, describes, illustrates a line of roller chain stock sprockets, including minimum Lore sprockets for reboring, also finished bore and Taper-lock bushed sprockets which are ready to use. Tables show speed ratios for sprocket combinations, standard keyways and setscrews. Includes chain selection and application data, installation and lubrication recommendations, chain length calculations, dimensions and price lists for single and multiple strand roller chains. Diamond Chain Co.

356 **Sprockets, Roller Chain**—Bulletin A-624 24 pp, is compiled to provide plant engineers with all data required for selecting and ordering roller chain and sprockets. A page devoted to Taper-Lock sprockets for each size of chain from 40 to 100, giving sectional drawing, dimensions, number of teeth, maximum stock bore available, weights, prices and other data. Another page covers Taper Lock bushings; and full information is given on riveted and cotter-type roller chains. Dodge Mfg. Co.

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... ARE THE KEY TO
BETTER PLANT LAYOUT
Open the door to more efficient plant layout with WIPCO wire partitions and enclosures. Use them for stock rooms, tool rooms, departmental divisions, or anywhere you need a rigid wall which will permit the passage of light, air, and vision.
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Two recognized symbols of safety . . . a Horton® elevated tank for fire protection and the seal of the Underwriters Laboratories, Inc. How are these two symbols linked here? By the recent installation of this 100,000-gal. Horton elevated tank at Underwriters Laboratories in Northbrook, Illinois. The Horton elevated tank provides the laboratory with a dependable gravity pressure water supply available night and day for a 388 head, automatic sprinkler system.

In addition to maximum protection, the installation of a Horton elevated tank often pays for itself through reduced fire insurance premiums.

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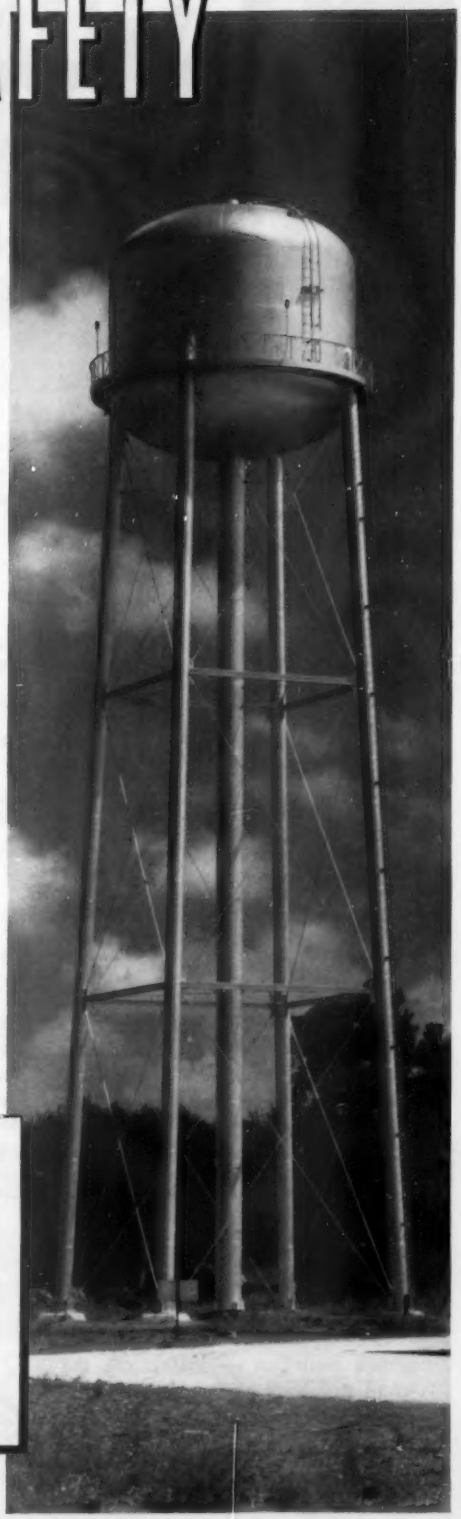

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MORE LIGHT
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- *Hard glass* resists moisture and temperature changes.
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You'll find two postage-free Reader Service Cards on pages 169-170. Use them for ordering these bulletins — just circle the item numbers of those you want. You may also use the cards for requesting advertised catalogs.

DATA FILE

(Begins on page 171)

VALVES, TRAPS, PIPING AND ACCESSORIES

358 **Relief Valves** — Twenty-pp Publication 5200 is replete with data on company's multiport relief valves for steam, air and gas service. Charts, diagrams, tables and examples of plant operating conditions serve to show how to select a relief valve. Text and illustrations show advantage of these valves over other relief valves, and booklet also shows how the Multiport relief valve can be used as a differential pressure spillover valve or a check valve in closed systems. Cochrane Corp.

359 **Choosing the Right Valve**—Presenting valve selection as a matter of matching the valve's service characteristics with the service requirements of the job, this practical 20-pp booklet explains and illustrates basic design features of gate, globe and check valves. It tells in non-technical language, how each of these valve types works, and where it is best suited for use. Disc, stem connection, bonnet and bonnet-joint characteristics are also discussed and the importance of stem operation is treated. A final chapter is devoted to common materials of valve construction. Crane Co.

360 **Steam Trap Book**—Catalog J, 44 pp, includes physical data and prices on cast semi-steel and forged steel inverted bucket steam traps, compound steam traps and ball float air and air relief traps; a handbook section explaining how to calculate condensate loads and select traps for all classes of equipment; a maintenance section. Armstrong Machine Works.

361 **Steam Trap Reference Manual** — Bulletin T-1740, 24 pp, tells why and where steam traps should be used; explains desirable trap features. Advantages of company's impulse steam traps are described, their operation illustrated. How to figure trap sizes and how to size condensate return lines are told and capacity and pipe dimension charts and thermodynamic properties of saturated steam included. Yarnall-Waring Co.

362 **Steam, Air and Gasoline Traps**—Catalog 751, 32 pp, is a recently issued trap ordering book with capacity tables, installation diagrams, and containing charts and formulas for determining proper size trap for specific applications. Covers thermostatic steam traps, expansion steam traps, weight-operated traps for steam, air, gasoline, pressures up to 1500 lb; separators. W. H. Nicholson & Co.

363 **Packless Expansion Joints**—Bulletin 35-51A offers 28 pp of up-to-date information on company's Corruflex joints, their design and installation and advantages over other means of providing for thermal expansion in pipelines. Construction features are explained and illustrated; simplified selection data include tables for determining amount of expansion in pipelines. American District Steam Co., Inc.

365 **Unions and Fittings**—Twelve-pp Catalog 50 covers manufacturer's line of unions of all types, elbows, tees, fittings. Dart Union Co.

366 **Aluminum Jacketing**—Economy and reduced maintenance offered by use of company's aluminum jacketing for insulated lines are stressed in illustrated Form J-1. Details fast application, corrosion protection afforded, other advantages. Step-by-step photos show how jacketing is applied. Includes specifications. Childers Mfg. Co.

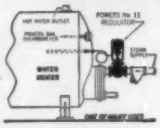
INSULATION

367 **Flexible Duct Insulation**—Form F-180 describes and gives product specifications for fiber glass flexible duct insulation. Advantages are cited, and easy installation procedure is illustrated. Also included are data on thermal insulating and acoustical insulating qualities. Fiber Glass Div., Pittsburgh Plate Glass Co.

368 **Pipe Insulation**—Bulletin F 1-100 features on-the-job installation photographs of cellular glass insulation for pipe temperatures between —300 and 800 F. Complete listing of physical properties, condensed specifications are given. Pittsburgh Corning Corp.

End Hot Water Complaints • Stop Wasting Fuel

due to OVER-heated water



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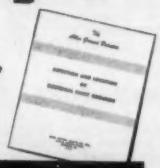

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180

DATA FILE

(Begins on page 171)

369 **Insulating Material** — Ultrafine, a new thermal and acoustical insulation made of blown glass fibers, is the subject of this bulletin. Complete with photos of insulation in use and tables showing its efficiency, gives physical properties, principal uses, handling characteristics, thermal conductivity, and acoustical efficiency. Gustin-Bacon Mfg. Co.

370 **Improved Heat Insulation** — This 8-pp bulletin describes Super-Light 85% Magnesia for temperatures to 600 F, available in cement blocks, pipe sections. Twelve advantages of this lightweight insulation are detailed. Recommended thickness, physical characteristics, prices are given. Also included is information on combination coverings with Tempchek inner layer for temperatures from 550 to 1500 F. The Philip Carey Mfg. Co.

INSTRUMENTS, CONTROLS

371 **Flow Meters** — Catalog 2320, 58 pp, fully illustrated, describes all types of manufacturer's flow meters, including indicating, recording, integrating and controlling instruments of evenly graduated and square root types, as well as area meters and differential converters. Includes tables on flow approximations, installation information, factors necessary to determine if fluid to be measured can be properly handled. Industrial Div., Minneapolis-Honeywell Regulator Co.

373 **Orifice Meters** — Bulletin 1050 Rev. 1, 28 pp, shows how manufacturer's orifice meters are made, how they operate. Tables give capacity data, and there are descriptions of manifold arrangements and differential ranges, along with illustrations of various parts. Sketches show how meters are used. Rockwell Mfg. Co.

375 **Industrial Thermometers** — Fourteen-pp Catalog 101 describes and pictures company's Gotham line of thermometers, including the Multi-Angle which can be rotated and tilted to practically any position. Includes temperature equivalent table. U. S. Gauge Div., American Machine and Metals, Inc.

377 **How to Weigh Tanks**—Bulletin 4106, 8 pp, explains how to weigh the contents of tanks, bins, and hoppers electronically with company's SF-4 load cells. Also covers installation design considerations such as mountings, temperature effects, corrosion protection, and vibrations. Diagrams and sketches accompany text. Baldwin-Lima-Hamilton Corp.

379 **For Industrial Metering**—Practical selection and application data on meters for industrial liquids are provided in 20-pp Form 566. Explains value of metering in batch mixing, process and cost control. Illustrated charts show how to select proper meter according to type, temperature and flow rate of liquid to be metered, and include specifications for models shown. Strainers, valves and other accessories are described. Neptune Meter Co.

FANS, BLOWERS

380 **Industrial Fans** — Propellair Bulletin 650, 12 pp, contains dimensions, application, and performance data of Tubeaxial and Stackbooster fans. Gives information on cooling and drying problems, system and open surface tank ventilation. Robbins & Myers, Inc.

381 **Industrial Exhaust Fan**—Housing design, wheel construction and standard arrangements of manufacturer's Type EX exhausters are discussed in illustrated Bulletin C-46EX. Provides capacity tables, dimensions and photos of standard and special fan. Bayley Blower Co.

BOILERS, GENERATORS

382 **Water Tube-Steam Generation**—Bulletin SB-51, 16 pp, discusses features of Keystone two-drum water tube steam generator for delivery of low cost steam. Cites advantages of conservative boiler rating (full five sq ft of heating surface for each developed horsepower), automatic controls, easy installation, fast steaming qualities, compact size. Gives specifications on all materials furnished, includes accessories. Erie City Iron Works.

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. . . bends ultra-thin stainless tubing
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And here's what Pines says about the Ampco Grade 20 wiper dies and Ampco-coated mandrels used on this machine.

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D-398

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COVERS ALL APPLICATIONS

SEND NOW for your copy of Partlow's new Condensed Catalog CC. See how the many Partlow Mercury Actuated Indicating Controls have been engineered with specific advantages for maximum efficiency in specific applications within –30°F to 1200°F range. One example is the versatile Model LSS — it does the job of *two* independent controls and may be used for four specific heating or cooling control systems. In addition to special application features like this, Partlow offers you *all* these quality advantages on *all* controls:

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DATA FILE

(Begins on page 171)

383 Packaged Boilers — This 16-pp illustrated catalog describes manufacturer's new Type TP package boiler. Following a section of background information is an outline of principal design features of these boilers, which are shop assembled and provide steam capacities from 4000 to 30,000 lb per hour. Space requirements are shown in a table along with specifications. Combustion Engineering, Inc.

384 Automatic Boilers — Bulletin BE-4 describes operation and advantages of Continental automatic boiler's spinning gas technique—a method of obtaining maximum heat transfer with a simplified design. Shows cutaway view of boiler construction; illustrates hinged doors and method of injecting air through static, turbine-like vanes into burner. Boiler Engineering & Supply Co., Inc.

385 Steam Generators—"Cyclonic combustion," a new method of heat transfer is discussed in this bulletin. Descriptive drawings show how air is introduced into combustion chamber at high speeds in revolving spiral vortex, radiating heat to fire tube through direct radiation and convection. Cyclotherm.

386 Steam Generators—Data and specifications for completely plant assembled water-tube steam generators are contained in this 8-pp bulletin. They cover nine sizes from 5,300 to 33,000 lb steam per hour and for pressures up to 400 psi. These units are designed for fully automatic firing with oil, gas or stoker-fired coal. Superior Combustion Industries, Inc.

388 Efficient Little Boiler—Bulletin AD-135 describes company's CB-50-80 boilers available in 50 to 80 hp (15 to 150 lb steam, 30 lb hot water) for heating and processing. Stresses such advantages as silent operation, fuel flexibility, speed, easy maintenance, and automatic operation. Discusses new hinged front and rear doors, forced draft systems, other features. Cleaver-Brooks Co.

ELECTRICAL EQUIPMENT

390 Variable Speed Motors—Sixteen-pp Bulletin 1797, revised, outlines many reasons why variable speed motors can be used to improve production, and it includes illustrations of all types of company's Varidrive motors, as well as their mechanical features, remote controls, etc. U. S. Electrical Motors, Inc.

392 Motor Starters—Booklet 1062, 16 pp, describes motor starters having short circuit protection for 2200- to 5000-v systems. Illustrates starters using company's 50,000 kva interrupting capacity type HS contactor; also starters which will safely interrupt the circuit from a bus of unlimited capacity. Indoor and outdoor installations are pictured. The Electric Controller & Mfg. Co.

394 Toggle Switch—Catalog 73a, 12 pp, covers 19 precision snap-action toggle assemblies and more than 90 AN and JAN approved designs, including assemblies that will control from 1 to 24 separate electrical circuits. Contains dimensions, operating characteristics, electrical ratings, contact arrangements on each switch, and an illustration of one representative switch from each group of switches. Gives general information on each "family" of switches, which are designed for low voltage d-c applications. Micro Switch Div., Minneapolis-Honeywell Regulator Co.

395 Batteries for Control Switchgear—This company's PlastiCal (lead calcium) and PlastiCell (high-tensile alloy grid) batteries for control, switchgear, and auxiliary power are described as to design, application and performance in Bulletins CP-536 and CP-537. Specifications, dimensional data included. C & D Batteries, Inc.

396 Regulated Power Equipment — Catalog 254, 32 pp, covers company's line of electronic a-c voltage regulators, regulated d-c sources and B supplies, electronic frequency changers, inverters, magnetic-amplifier d-c sources, and related equipment. Besides giving general information on the operating principles of these instruments, booklet explains reasons for regulating line voltage and advantages of electronic regulations. Sorenson & Co., Inc.

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How a 'Sexauer' Easy-Tite faucet washer costing pennies can save you $115.22 a year!

A tiny, 1/32" faucet leak wastes 95,040 gallons—*$24.14* worth*—of water yearly.

Hot water leakage is even costlier . . . Fuel waste adds upward to *$91.08*** more to the loss. Total down the drain: *$115.22*.

And this is the dollar loss caused by only *one* pinpoint leak!

Fuel Waste	Water Waste	Total Waste
Oil (792 gals.) **$91.08	$24.14	$115.22
Coal (9,879 lbs.) 88.91	24.14	113.05
Gas (84,411 cu. ft.) 84.81	24.14	108.95

*Water costs (figured at $1.90 for 1,000 cu. ft.) authenticated by Hackensack Water Co. **Fuel costs authenticated by American Gas Association.

Save money; cut costs; stop leaks with dependable 'Sexauer' Easy-Tite faucet washers.

Built like a tire with Fiberglas reinforcement

Easy-Tite faucet washers are made of a special du Pont product, instead of rubber, and reinforced with Fiberglas. The result is a washer that resists the closing squeeze that splits and mushes ordinary washers. And Easy-Tites withstand destructive heat (up to 300° F. by test). These features explain why *'Sexauer' Easy-Tites outwear ordinary faucet washers 6 to 1!*

By avoiding labor on those 5 additional repairs, Easy-Tites cut today's high maintenance costs 83⅓%! But Easy-Tites not only save water, fuel, labor; they also prolong the life of expensive fixtures.

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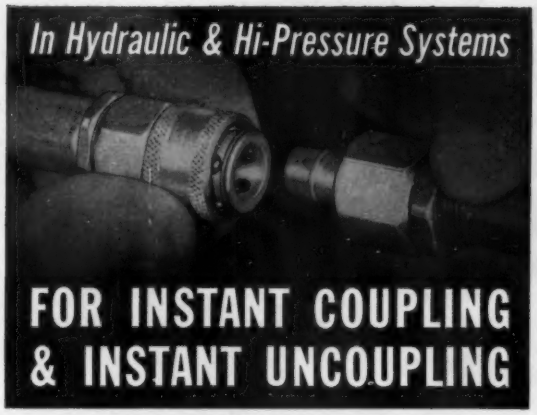

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The Smallest Coupling, Size for Size, with Higher Efficiency and Highest Strength

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Available in sizes 1/8" to 10" of alloy steel, stainless steel, or to specification

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USE THE RIGHT TYPE TRAP FOR THE JOB!

TYPE OF TRAP	SNAP ACTION (Fig. 1)	REGULAR BALL FLOAT (Fig. 2)	INVERTED BUCKET (Fig. 3)
Handles oil?	Light oil only	No	Very well
Handles dirt?	Moderate	No	Very well
Air loss?	None	None	Small
Requires priming?	No	No	Yes
Float collapse or leakage?	Remote	Remote	Impossible
Gravity drainage to trap required?	Yes	Yes	No

FIG. 1

FIG. 2

FIG. 3

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ARMSTRONG MACHINE WORKS
912 Maple Street, Three Rivers, Mich.

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TO SAVE COSTS
Factory-trained Cyclotherm engineers will . . . without charge . . . work from drafting board to installation to estimate your steam demands.
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Factory-trained Cyclotherm servicemen are as close as your telephone . . . They are on call at any hour of the day, night or week-ends.
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Cyclotherm Steam Generators range from 18 to 500 hp. . . . from 15 to 200 psi. For industrial and commercial plants, shipping, institutions.
Select a
CYCLOTHERM
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GENERATOR

Planning a new building? Remodeling an existing structure? As much as ⅓ smaller than other packaged units, the Cyclotherm Steam Generator allows more space for storage and production. Needs only a minimum-sized, minimum-cost boiler room. Or can be placed in a working area. Radiant heat loss is at a minimum.

Lighter-weight, it costs less to transport. Simpler in design, it requires less rigging time . . . rigging costs.

Yet it delivers a guaranteed 80% efficiency . . . pays for itself in a few years in fuel savings alone . . . cuts maintenance costs up to 50%. And it gives you 66% more steam generating power per sq. ft.! Needs less heating area per boiler h.p.!

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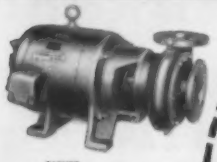

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L & H PUMPS
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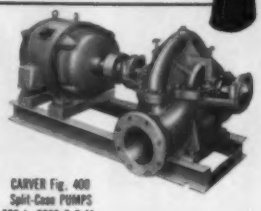
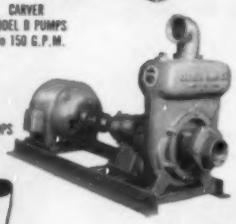


CARVER Fig. 400
Split-Case PUMPS
200 to 2000 G.P.M.

CARVER
MODEL B PUMPS
6 to 150 G.P.M.



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Self-Priming
20 to 4000 G.P.M.

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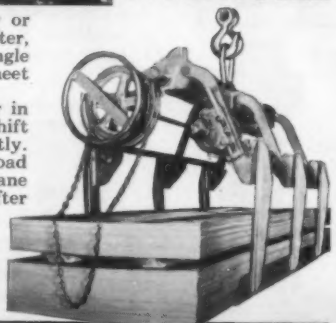

Bulletin SL-25 gives you the complete story of C-F Lifter advantages to you. Ask for it today. There's no obligation.

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DATA FILE

(Begins on page 171)

397 **Switch Wiring Diagrams**—Bulletin 709 is a 36-pp booklet of typical wiring diagrams for across-the-line starting switches. Indexed and arranged for easy use, this booklet serves as a guide to some of the many ways in which this company's manual and magnetic across-the-line starters can be applied. Some of the diagrams incorporate more than one useful feature. Includes key to electrical symbols used. Allen-Bradley Co.

398 **Plug-In-Power**—Sixty-pp Catalog 25 offers real help on electrical installation problems involving portable tools, materials handling equipment, cranes, hoists, cutting equipment. Covers a prefabricated trolley busway electrical distribution system to provide outlets for power or light where needed. Feedrail Corp.

399 **The Answers on Wiring**—"20 Questions and 20 Answers on Safety m.i. Wiring" describes and illustrates characteristics and advantages of this new wiring system. A complete table of types, sizes, weights, and lengths, as well as a partial list of users included. General Cable Corp.

400 **Power and Control Cables**—Sixty-pp Catalog 24 describes typical power and control cable designs and is intended as a guide in selecting proper wire and cable type. Describes insulations, sheaths and coverings, electrostatic shielding, and includes product data on all types listed. Rome Cable Corp.

401 **Handbook on Storage Batteries**—This 64-pp booklet of instructions and technical data is the sixth edition of this company's battery service manual. Provides a brief treatise on the theory of the lead-acid battery. Gives detailed instruction on the care and operation of batteries, on maintenance and repairs, and on standard and special parts. Booklet is of special value to plant engineers concerned with storage batteries for cycle service in industrial trucks and materials handling equipment. Gould-National Batteries, Inc.

402 **Retractile Cords** — This 8-pp bulletin presents retractile cords for general communication and power applications. Containing catalog data and ordering information as well as application photos, explains how the cords are made, where used, and advantages offered. Koiled Kords, Inc.

403 **Productive Maintenance** — Publication GED-1691 is a pocket-size 104-pp source of information of value to plant engineers who want to get more production from their present motors, generators and control equipment. Besides general maintenance suggestions, the booklet contains trouble shooting charts and recommended renewal parts guides. Also provides wire and cable data and includes a section of formulas and other data pertaining to motors and generators. General Electric Co.

LIGHTING, COMMUNICATION

404 **Selection Data on Lighting Fixture Hangers**—Catalog 50, 80 pp, contains general and detailed information on disconnecting and lowering lighting fixture hangers, accessories, special devices and parts. Utilizes 247 photos and drawings to show construction principles, operating features, installations, modifications and component parts for both indoor and outdoor units. The Thompson Electric Co.

405 **Fluorescent Lighting**—This 24-pp fluorescent lighting guide book is a reference digest on fluorescent products. Gives advantages of this type of lighting; summarizes various lamps and parts, including starter sockets, lampholders. Includes reference chart for lamp performance when interchanged with typical ballasts. Tabulations include seven shades of "white" lamps and 4 pp of ordering information. Sylvania Electric Products Inc.

407 **Television Equipment** — Twenty basic applications for "TV Eye" low-cost closed circuit television equipment are described and pictured in Form 3R2335. Folder explains equipment's functions and operation, lists specifications. Radio Corp. of America.

408 **How to Use Sound Signals**—This new 44-pp combination manual, data book and cata-

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STOPS DUST

DUST COLLECTORS
SAVES
6 WAYS

FASTER INSTALLATION
LONGER MACHINE LIFE
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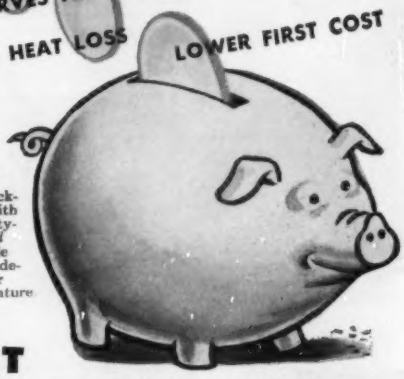

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LIQUIDOMETER
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- FOR GAUGING LIQUIDS OF ALL KINDS
- 100% AUTOMATIC
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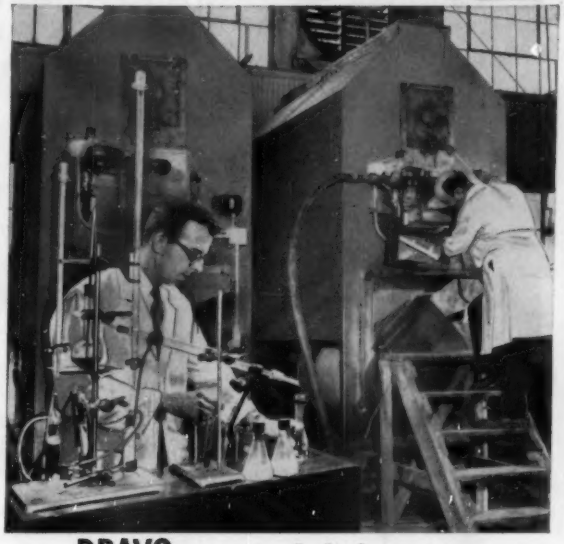
another
DRAVO HEATER plus!



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1. The over-size floating stainless steel combustion chamber which gives Dravo Heaters 70% longer service life.
2. The heavy-gauge outer steel casing provides added strength and better insulation, resulting in less than 1% heat loss.
3. Special combustion chamber design which conserves fuel, provides economical heating.
4. Fuel burners that will operate on a wide range of fuels and provide the most efficient utilization of fuel.

That's just part of the Dravo Heater story. There's more to come, because continued research is being done to make Dravo Heaters better than ever for all types of commercial and industrial uses.

This is just another reason why dollar for dollar and year for year of operation, Dravo heaters are your best heating investment.

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DRAVO

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- ☐ *Counterflo* Space Heater 400,000-2,000,000 Btu/hr. output
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- ☐ Please have your representative call at no obligation to me. Ask for Bulletin LM 599-021

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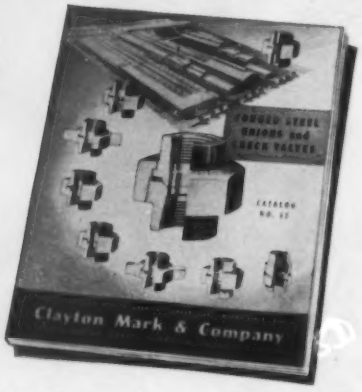

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(Begins on page 171)

log is an excellent reference work on industrial sound signals. Includes a simplified explanation of fundamentals of sound; a glossary of sound and signal terminology; a quick-comparison guide for selecting equipment; suggested steps in choosing a signal installation, and hints for compiling a code signal call system. Benjamin Electric Mfg. Co.

HEATING, HEATERS

409 **Forced Air Space Heaters**—Illustrated Bulletin 523-B, 12 pp, is devoted to a line of forced air heaters for comfort heating, year-round ventilating, tempering make-up air, process drying and heat curing. Explains design efficiency, construction details, operating principles and flexibility of application. Advantages of the heater are detailed. Dravo Corp.

410 **Buying a Portable Heater?**—Stressing safety factors involved, this 40-pp booklet, "Guide to the Selection and Use of Portable Space Heaters," analyzes temporary heating equipment from standpoints of personnel well-being, property protection and fire and accident prevention. Classifies basic types of direct, indirect-fired heating devices. Herman Nelson Div., American Air Filter Co., Inc.

411 **Plumbing, Heating Supplies**—Edition G is the current edition of this company's 118-pp general catalog on plumbing and heating repair parts, tools and accessories. Indexed and generously illustrated; gives sizes, intended uses and ordering data. J. A. Sexauer Mfg. Co., Inc.

412 **Unit Heaters**—Bulletin 7517, 48 pp, presents full information on latest design of this company's Venturafin unit heaters for steam or hot water applications. Gives features of construction, general engineering data, capacity tables. Fully illustrated with photos of horizontal and vertical models, dimensional

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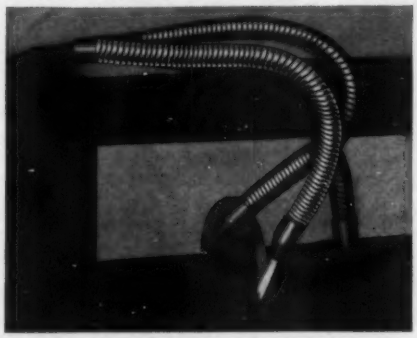

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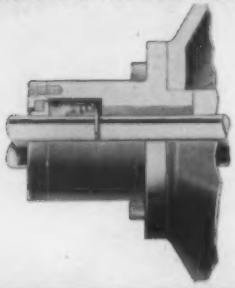
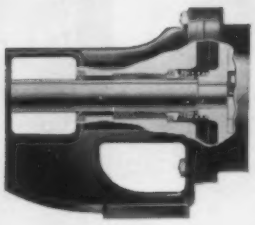


54 HEAVY-DUTY PUMPS



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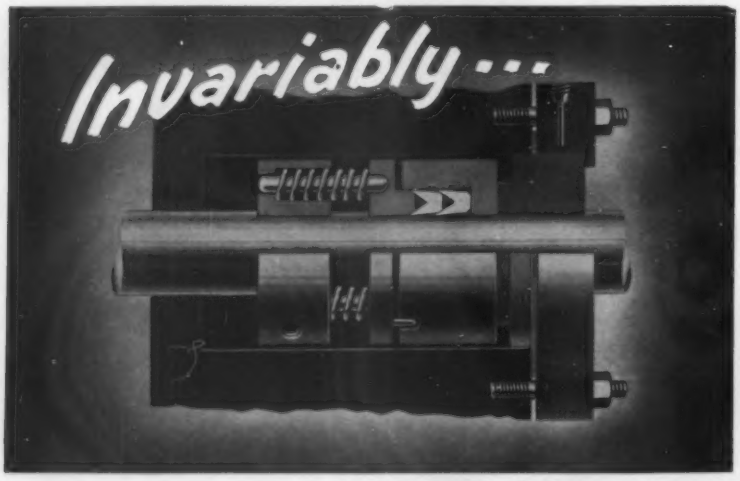

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DATA FILE

(Begins on page 171)

drawings and piping diagrams, booklet includes tips on the use and selection of unit heaters. American Blower Corp.

413 **What Unit Heaters Can Do**—Featuring many photos showing how unit heaters are being used to provide heating comfort, cut fuel costs, provide economical air circulation, 8-pp Bulletin 149-A discusses advantages of these heaters and gives performance data. Modine Mfg. Co.

414 **Hot Water for Industry**—An excellent engineering data booklet, "Hot Water for Industrial Plants," is a compilation of literature covering use of water heaters for process needs, cafeterias, lavatories, wash fountains, laboratories. Discusses hot water requirements for these applications; describes and illustrates heaters, recovery systems, booster units applicable; provides installation suggestions and operating instructions. Available to qualified plant engineers, please state your title. A. O. Smith Corp.

415 **Gas Heaters**—How, why and when to use gas-fired unit heaters is outlined in pocket-sized Bulletin SA-541-A, 20 pp. Includes hints on heater selection and installation, schematic diagram explaining how water works, instructions for estimating heat loss and computing gas requirements. Reznor Mfg. Co.

VENTILATING AND AIR CONDITIONING

416 **Ventilating Equipment**—A 36-pp guide to selection of propeller fan type ventilating equipment, Catalog 151 includes specifications and installation data on company's propeller fans in portable, tubeaxial, centrifugal, roof ventilator and other types. Detailed illustrations of construction features accent design and performance factors. Case study photos show installations. Ilg Electric Ventilating Co.

417 **How Conditioning Units Can Help**—The advantages of self-contained units in cooling, dehumidifying, cleaning are cited in 40-pp Catalog 1307. Explains installation, operation. Provides data on direct expansion and cold water cooling and on hot water and steam heating. Clarage Fan Co.

419 **Air Conditioning Filters**—Bulletin 600, 8 pp, describes company's Staynew ventilation and air conditioning filters. Specifications, engineering, performance and installation data

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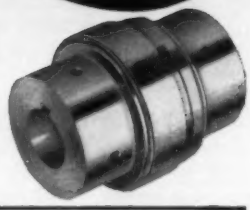

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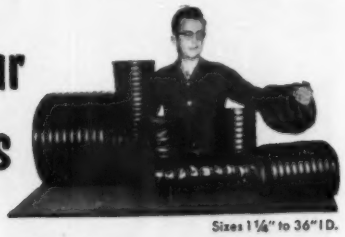

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DATA FILE

(Begins on page 171)

covering dry type panel filters, for the removal of air-borne impurities given. Dollinger Corp.

DUST CONTROL

421 **Manual of Exhaust Hood Design**—Bulletin 270-E1, 24 pp, features engineering data on dust control systems for the metal working industries. Illustrates and discusses the design of exhaust hoods for many operations in this field. Also, 61 photos of dust control installations show various methods of hooding dust source. American Air Filter Co., Inc.

422 **Dust Control Blast Cleaning** — Bulletin Cleaning 1210, 24 pp, fully illustrated, describes manufacturer's line of blast cleaning and dust control equipment, accessories. It is indexed according to equipment, type and purpose. Lists three methods of abrasive application. Pangborn Corp.

424 **Improved Dust Filters**—Sixteen-pp Bulletin 528-R gives information on continuous-automatic dust filters that can be furnished or unhoused for use on pressure or vacuum. Explains principle of cleaning the filter cloth with high pressure reverse jet air, and tells where these filters are being used. Provides comparative test data on these and other type filters; discusses industrial dust control service offered and diagrams some installations. Self-adjusting blow rings furnished with these filters are described in detail. The Day Co.

TOOLS, WELDING AND MACHINE SHOP EQUIPMENT

426 **Hydraulic Pullers** — Industrial maintenance problems involving removal and installation of gears, bearings, pulleys sheaves, pinion shafts, couplings and tubes are treated in Power-Twin Bulletin HY-1953, 24 pp. Covers use and application of pullers, attachments and adaptors for 17½-, 30- and 50-ton hydraulic rams. Also shows puller sets for use with company's center-hole rams. Owatonna Tool Co.

427 **Where to Use Your Stud Driver** — Twenty-pp pocket-size Form 955 describes and pictures applications of studs, using company's Model 450 stud driver. Provides some operating hints and saftey precautions and covers use of studs through steel into concrete, wood into concrete, wood into steel and steel into steel, as well as their use for attachment of pre-drilled fixtures. Remington Arms Co., Inc.

428 **Resistance Welding** — Featured in this 24-pp catalog are newly-designed tips and holders recently added to company's equipment. Full information is also given about other holders, tips, seam welder wheels and shafts and bushings, in manufacturer's line, as well as flash, butt, barrel and other welding dies. Ampco Metal, Inc.

429 **Data for the Shop**—"Fluids and Facts for Metal Working," is a pocket-size booklet of about 44 pp. A section on metal working fluids covers their function and selection, preparation and use of soluble oils and paste compounds, and prevention of dermatitis. A section on metal working facts gives conversion tables, steel numbering systems, machinability ratings of metals, drill grinding charts, twist drill sizes and other data. Booklet also includes product data on industrial oils, machine tool lubricants, greases, quenching and tempering oils. Standard Oil Co. (Ind.)

OTHER EQUIPMENT

430 **Sling Handbook and Riggers Manual** —In the sling handbook section of this 48-pp book, 11 sling types are illustrated and their dimensions, weights and safe working loads given. Illustrations of sling uses accompany factual data. Also pictured and detailed are sling fittings. Information on care of slings, data on braided wire fabric and directions on splicing braided wire sling fabric included. The riggers manual gives detailed instruction on splicing, and includes data on efficiencies of wire rope attachments. Union Wire Rope Co.

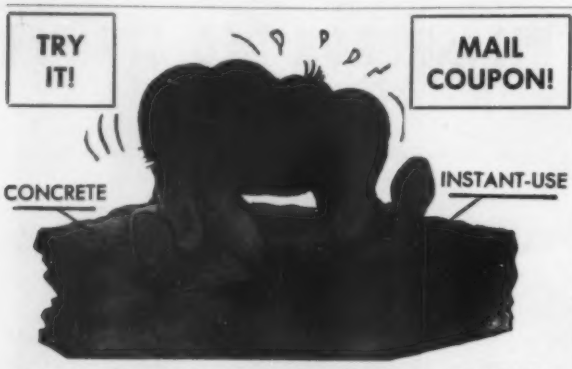
431 **Reference File of Plastics, Resins**—Now available is the 12-pp 1954 condensed reference file of Bakelite and Vinylite plastics and resins. Covers molding and extrusion materials, wire and cable coverings, bonding resins, protective coating resins, laminating plastics, rigid sheets, flexible film and sheeting, calendering materials. Bakelite Co., Div., Union Carbide and Carbon Corp.

432 **Rigid Plastic Material**—The advantages, uses and available forms of Bolatron 6200 are presented in this catalog, about 14 pp. Gives dimensional data, tolerances, weights for sheet, bar stock, pipe, fittings and valves made of this unplasticized polyvinyl chloride. Includes thermal, electrical and mechanical properties, also detailed information on chemical resistance. H. N. Hartwell & Son, Inc.

433 **Metal Hose Manual** — Technical Data Book U-111, 24 pp, includes information on application, temperature ranges of various types of metal and wire braided hose, dimensions, couplings, assemblies. Type of hose manufactured by this company are illustrated and described, including seamless all-metal flexible pressure hose; interlocked suction, blower and conveyor hose; square locked conduits and flexible spout tubing; double wire-braided hose for high pressure. Universal Metal Hose Co.

434 **Improved Hose Coupling** — A quick connect-disconnect hose coupling for water, oil, steam, gas and chemical lines is described in this 16-pp bulletin. Describes the coupling's construction and explains how it provides a sealing action which makes the coupling tighter as internal pressure increases, and a full swiveling action that prevents hose twisting and kinking. Titeflex, Inc.

435 **Oil Cooling Equipment**—Catalog F-B 1052, 20 pp, discusses controlled quench, oil cooling for uniform quality in heat-treated metals. Describes and illustrates typical installations of coolers: tells how to select cooling systems; and gives circulation rates. Charts show oil recirculation for batch quenching, determination of amounts of oil required. Illustrates accessories including Kleen-Well oil strainers. "Perambulators" oil coolers, junior quencher, pumps. Bell & Gossett Co.



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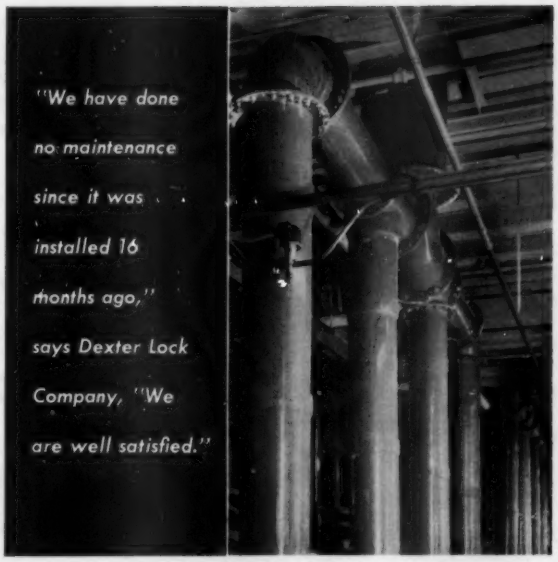

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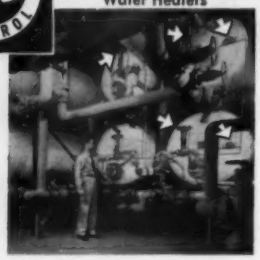

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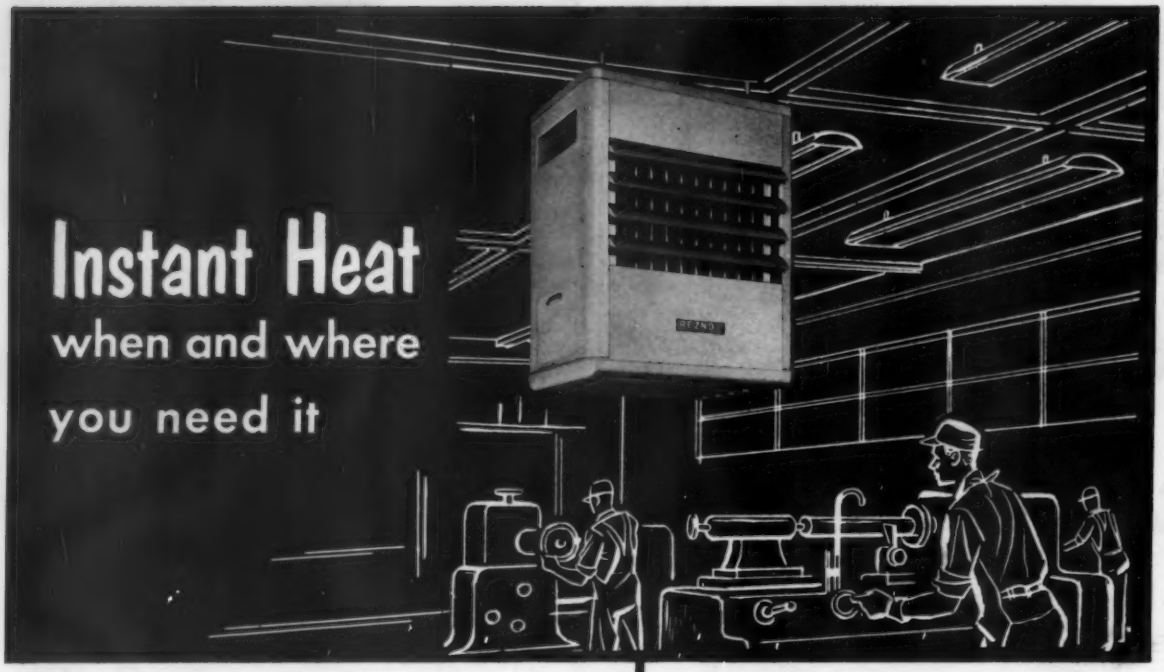

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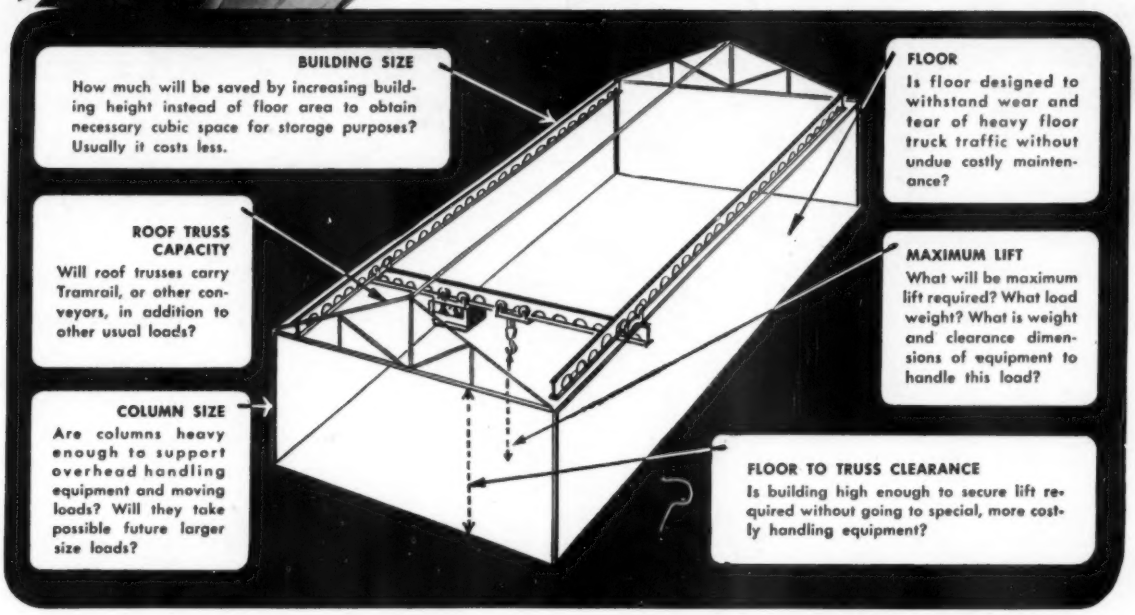
Don't Forget *Materials Handling* When Designing the Building


BUILDING SIZE
How much will be saved by increasing building height instead of floor area to obtain necessary cubic space for storage purposes? Usually it costs less.
ROOF TRUSS CAPACITY
Will roof trusses carry Tramrail, or other conveyors, in addition to other usual loads?
COLUMN SIZE
Are columns heavy enough to support overhead handling equipment and moving loads? Will they take possible future larger size loads?
FLOOR
Is floor designed to withstand wear and tear of heavy floor truck traffic without undue costly maintenance?
MAXIMUM LIFT
What will be maximum lift required? What load weight? What is weight and clearance dimensions of equipment to handle this load?
FLOOR TO TRUSS CLEARANCE
Is building high enough to secure lift required without going to special, more costly handling equipment?

The foremost demand of a new factory building, whether for production or storage, is that its design and construction aid overall operating efficiency to the utmost. Thus, the building becomes more than just an enclosure, but is actually a vital part of the manufacturing process.

It is, therefore, imperative that the various steps entering into the making of an item be thoroughly considered when the building is designed. One of the most important of these concerns materials handing because this item often amounts from 25% to 50% of the total production cost, and, also, because it is plant-wise in nature.

Regardless of what handling methods are deemed best, overhead cranes or Tramrail, roller or chain conveyors, floor trucks, etc., the building design, size and construction usually has a tremendous bearing on the ultimate handling efficiency secured. Building clearances, floor construction, column locations, aisleway allowances and other factors must be considered for the different handling methods for most satisfactory results.

For initial economy in installation, for most satisfactory operation and highest efficiency, plan for materials handling when you design the building. ***Do not make materials handling an afterthought.***

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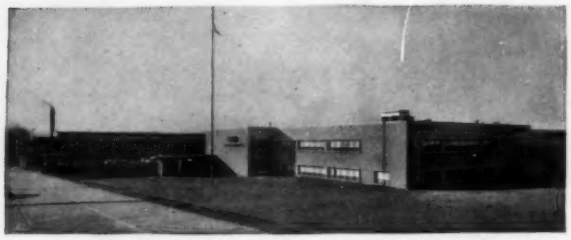

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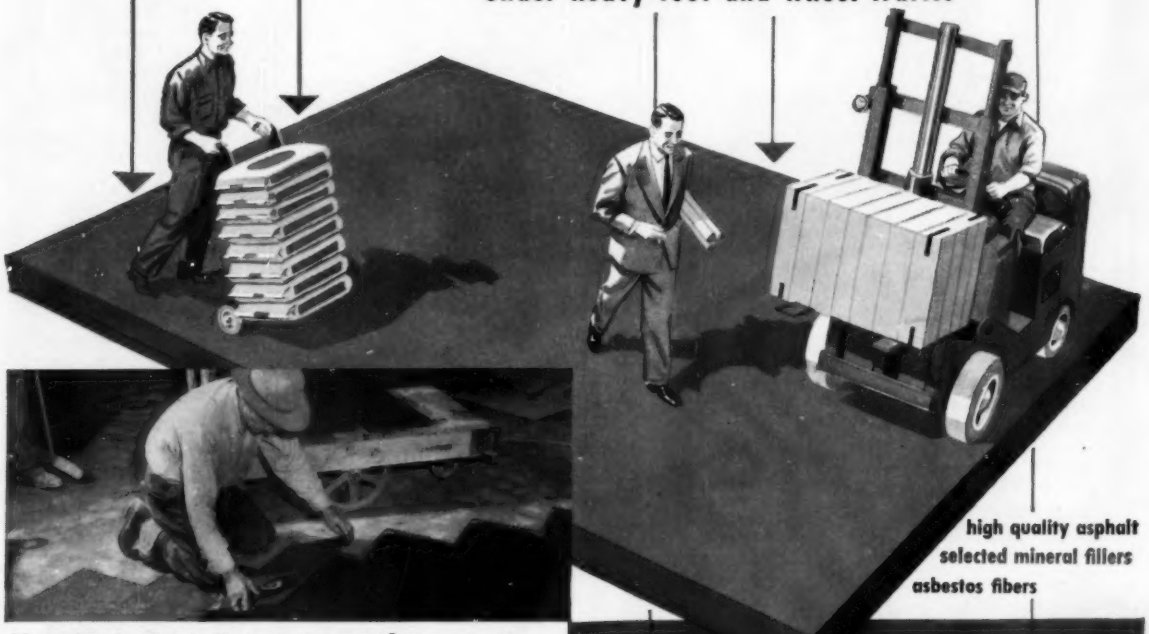

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